

DOCUMENT RESUME

ED 095 516

CS 001 322

AUTHOR Gustafson, David Joseph
TITLE Learnability of Basic Sight Words.
INSTITUTION Wisconsin Univ., Madison. Research and Development
Center for Cognitive Learning.
SPONS AGENCY National Inst. of Education (DHEW), Washington,
D.C.
REPORT NO WRDCCL-TR-262
PUB DATE Aug 73
CONTRACT NE-C-00-3-0065
NOTE 85p.; Report from the Project on Conditions of School
Learning and Instructional Strategies

EDRS PRICE MF-\$0.75 HC-\$4.20 PLUS POSTAGE
DESCRIPTORS Kindergarten Children; *Learning Processes; Reading
Instruction; *Reading Research; Reading Skills;
*Sight Vocabulary; *Word Lists

ABSTRACT

This study was designed to rank the first 100 words of the "Great Atlantic and Pacific Sight Word List" according to learnability. The differences in the learnability rankings of the words due to the sex of the subject and the relationship between the learnability and frequency rankings of the words were also examined. Subjects in the study were 200 kindergarten pupils enrolled in eight northeastern and central Wisconsin elementary schools. No significant differences were found between the overall learning ability of males and females or between the learnability and frequency rankings of the words. It was concluded that a rank-order of the first 100 words of the "Great Atlantic and Pacific Sight Word List" had been determined; the sex of the subject seemed to be related to the learnability of some words, but the real significance of this relationship was open to question; and the frequency and learnability rankings of the words were not related. (RB)

ED 095516

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRO-
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIGIN-
ATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRESENT
OFFICIAL NATIONAL INSTITUTE OF
EDUCATION POSITION OR POLICY

Technical Report No. 262

LEARNABILITY OF BASIC SIGHT WORDS

Report from the Project on Conditions of
School Learning and Instructional Strategies

by David Joseph Gustafson

Wayne Otto
Principal Investigator

Wisconsin Research and Development
Center for Cognitive Learning
The University of Wisconsin
Madison, Wisconsin

August 1973

OS 001324

© Copyright by David J. Gustafson 1973

All Rights Reserved

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the National Institute of Education, Department of Health, Education, and Welfare. The opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education and no official endorsement by that agency should be inferred.

Center Contract No. NE-C-00-3-0065

STATEMENT OF FOCUS

Individually Guided Education (IGE) is a new comprehensive system of elementary education. The following components of the IGE system are in varying stages of development and implementation: a new organization for instruction and related administrative arrangements; a model of instructional programming for the individual student; and curriculum components in prereading, reading, mathematics, motivation, and environmental education. The development of other curriculum components, of a system for managing instruction by computer, and of instructional strategies is needed to complete the system. Continuing programmatic research is required to provide a sound knowledge base for the components under development and for improved second generation components. Finally, systematic implementation is essential so that the products will function properly in the IGE schools.

The Center plans and carries out the research, development, and implementation components of its IGE program in this sequence:

- (1) identify the needs and delimit the component problem area;
- (2) assess the possible constraints--financial resources and availability of staff;
- (3) formulate general plans and specific procedures for solving the problems;
- (4) secure and allocate human and material resources to carry out the plans;
- (5) provide for effective communication among personnel and efficient management of activities and resources;
- and (6) evaluate the effectiveness of each activity and its contribution to the total program and correct any difficulties through feedback mechanisms and appropriate management techniques.

A self-renewing system of elementary education is projected in each participating elementary school, i.e., one which is less dependent on external sources for direction and is more responsive to the needs of the children attending each particular school. In the IGE schools, Center-developed and other curriculum products compatible with the Center's instructional programming model will lead to higher morale and job satisfaction among educational personnel. Each developmental product makes its unique contribution to IGE as it is implemented in the schools. The various research components add to the knowledge of Center practitioners, developers, and theorists.

ACKNOWLEDGEMENTS

There are many people who, over a period of many years, have contributed to this study in different ways. I am grateful to all and mention but a few here.

First and foremost, I am indebted to my parents for their guidance, both heeded and unheeded, and their encouragement over the years. I regret that my father is no longer here to witness the end of this struggle and I dedicate this paper to his memory.

I am further indebted to Drs. Jean Caudle and Donald Quick of the University of Wisconsin-Oshkosh for their advice, time, and inspiration in beginning the doctoral program.

Special thanks must go to Dr. Wayne Otto, my major professor, who has nurtured me during my time in Madison. My horizons have been widened and my life enriched through this association.

To Drs. Frank Farley, my minor professor, Dale D. Johnson, Richard Smith, and Lawrence Hubert, I offer my gratitude for their counselling and guidance concerning this study and for their time spent while serving on my various committees.

To the administrators, teachers, and children in the Kaukauna and Clintonville school districts I offer my thanks for their support and cooperation without which this study would not have been possible.

I am grateful to the staff of the University of Wisconsin Research and Development Center for Cognitive Learning both for my associations with them as well as for the aid they have given me.

Special recognition must also go to Roger Klumb and Robert Rude, fellow students, for their friendship and frolics. They kept my pencil pushing.

To Mary Anne, my wife, I offer my appreciation for her efforts in keeping food on the table and for her deletion of many of the weird words that don't appear in this paper.

Finally, my sincere thanks to my three daughters, Davina-marie, Katrina Jane, and Amanda Anne, who kept bugging me to finish this paper so that they could go to the zoo and the beach.

TABLE OF CONTENTS

	<u>Page</u>
Acknowledgements.....	iv
List of Tables.....	ix
Abstract.....	xi
Chapter	
I. SCOPE AND BACKGROUND OF THE STUDY.....	1
Contribution of the Study.....	2
Related Literature.....	3
Word List Research.....	3
Learnability.....	7
Sex Effect.....	13
Frequency.....	15
Questions.....	18
II. METHOD.....	21
Subjects.....	21
Words.....	27
Procedure.....	31
Analysis.....	33
III. RESULTS AND DISCUSSION.....	35
Question 1.....	35
Question 2.....	38
Question 3.....	45
Which List to Use.....	45

TABLE OF CONTENTS (cont.)

	Page
IV. SUMMARY, CONCLUSIONS, LIMITATIONS, AND RESEARCH IMPLICATIONS.....	49
Summary	49
Conclusions.....	50
Limitations.....	51
Research Implications.....	51
REFERENCES.....	53
APPENDIX A.....	57
APPENDIX B.....	65
APPENDIX C.....	75
APPENDIX D.....	81

LIST OF TABLES

Table		Page
1	Locations, School Districts, Schools and Demographic Characteristics.....	22
2	Schools, Classrooms, Selection, and Enrollment by Sex.....	23
3	Learning Rate Subtest of the Murphy-Durrell Reading Readiness Analysis.....	24
4	Stratified Groups According to Murphy-Durrell Raw Scores and Sex.....	25
5	Random Groups and Murphy-Durrell Scores and Means of Boys, Girls, and Combined Groups.....	26
6	Length of Words, Frequency, and Number of Letters.....	28
7	Random Groups According to Word Length.....	29
8	Randomly Selected Word Groups.....	30
9	Error Score Pattern of a Typical Word.....	33
10	Rank-Order of the First 100 Words of the <u>Great Atlantic and Pacific Sight Word List</u> in Terms of Difficulty.....	37
11	Rank-Order of the First 100 Words of the <u>Great Atlantic and Pacific Sight Word List</u> in Terms of Difficulty by Males.....	39
12	Rank-Order of the First 100 Words of the <u>Great Atlantic and Pacific Sight Word List</u> in Terms of Difficulty by Females.....	40
13	Comparison of Murphy-Durrell Scores and Error Scores of Males and Females for Selected Words.....	42
14	Words, Group Error Scores and Means by Sex.....	43
15	Learnability and Frequency Ranks of the First 100 Words of the <u>Great Atlantic and Pacific Sight Word List</u>	46

ABSTRACT

This study was designed to rank the first 100 words of the Great Atlantic and Pacific Sight Word List according to learnability. The differences in the learnability rankings of the words due to sex and the relationship between the learnability and frequency rankings of the words were also examined.

Subjects in the study were 200 kindergarten pupils enrolled in eight northeastern and central Wisconsin elementary schools. All subjects were chosen through a random selection of classrooms. The subjects were administered the Murphy-Durrell Reading Readiness Analysis: Learning Rate Subtest. The subjects were then stratified according to their Murphy-Durrell scores and randomly assigned to 20 groups.

The first 100 words of the Great Atlantic and Pacific Sight Word List were arranged in alphabetical order and broken into five groups: Words 1-20; 21-40; 41-60; 61-80; and 81-100. Then the words were randomly assigned to 20 groups of five words each. The assignment of the words was controlled for both initial letters and length of the words. The 20 groups of words were then randomly assigned to the 20 groups of subjects. In the study each word was learned by ten subjects of whom five were male and five were female.

Each word was presented on a flashcard accompanied by an oral sentence which illustrated the most frequent usage of that word. Later the words were presented in isolation and if the subject did not respond correctly in ten seconds, the initial treatment with the oral sentence was repeated. The order of presentation was randomized each time and there were a possible 20 trials. The criterion was one successful identification of all five words. Correlation coefficients and the Wilcoxon Test for two matched samples were used to analyze the data.

Three rank-order lists of the words were obtained: a) list by total sample, b) list by males, and c) list by females. The correlation coefficient between the lists by males and females was .67 ($p < .01$). No significant differences were found between the overall learning ability of males and females or between the learnability or frequency rankings of the words.

It was concluded that: 1) a rank-order of the first 100 words of the Great Atlantic and Pacific Sight Word List had been determined; 2) the sex of the subject seemed to be related to the learnability of some words, but the real significance of this relationship was open to question. There was no significant difference in overall learning by males and females; and 3) the frequency and learnability rankings of the words were not related.

Chapter I

SCOPE AND BACKGROUND OF THE STUDY

Even a cursory examination of many of the reading programs used today in American schools gives credence to the idea that a sight vocabulary can be a useful tool for teaching beginning reading skills. A good sight vocabulary list should have the following attributes: a) contain high frequency words, words of high utility value, b) permit a possible focus on meaning as well as decoding in early reading, and c) serve as a basis for analytic phonics instruction.

A 500 word sight word list based upon the American Heritage Intermediate Corpus developed by John B. Carroll et al. (1971) was compiled by Otto and Chester (1972). They named their list The Great Atlantic and Pacific Sight Word List and recommended it because of its empirical support. The list includes words "drawn from 215 published materials (texts) representative of third grade materials in 20 different areas ranging from 'reading' to 'social studies,' 'magazines,' and 'religion'" (Otto and Chester, 1972, p. 436). The 500 words included in this list account for almost three-fourths of the words that occurred in the 840,875 words (tokens) sampled at grade three by Carroll et al. (1971). "In other words, among the 840,875 tokens sampled there were 23,477 different words or types. The 500 types in our list account for 604,867 of the tokens" (Otto and Chester, 1972). The most frequent 100 words of the Great Atlantic and Pacific Sight Word List, which were used in this study, account for 429,837 of the total 840,875 words (tokens) in the

grade three corpus.

It was the original intent of the experimenter to study all of the 500 words. However, after careful consideration of the constraints of this type of study, i.e., method of presentation and testing time, and consideration of the fact that a 500 word list was probably too large for practical classroom use, it seemed more feasible to do a subsection of the total sample. The first 100 words were chosen for consideration in this study because of their great utility value, i.e., they account for more than half the tokens sampled at grade three by Carroll et al. (1971).

The purpose of this study was to rank the 100 most frequent words of the Great Atlantic and Pacific Sight Word List by learnability. In addition, the effects of sex and frequency on learnability were evaluated.

Contribution of the Study

This study was designed to answer the following specific questions:

(a) In terms of difficulty of learning, what is the rank order of the first 100 words of the Great Atlantic and Pacific Sight Word List? (b) Are the 100 most frequent words of the Great Atlantic and Pacific Sight Word List differentially difficult for males and females? and (c) What is the relationship between the learnability and frequency ratings of the words? The results of this study might provide classroom teachers with potential learnability information about the words. The results might also provide an empirical basis for those interested in controlling vocabulary in published materials.

Related Literature

The review of literature is limited to four areas: (a) word list research, (b) the learnability construct, (c) the relationship between sex and reading ability, and (d) the relationship between frequency and learnability

Word List Research

In the past innumerable word lists have been compiled for various and sundry reasons. The rationale for including the studies which follow in this review was to show that word lists have been the focus of studies, other than learnability, in the past. Learnability will be treated in the next section of this review.

Two types of studies are presented below. The first study concerns an examination of the acquisition of words through a comparison of three word lists. The following studies look at word lists in relation to the vocabulary of basal readers and their use with children.

Anderson (1973) studied the acquisition of sight words in a comparison of three word lists: Dolch (1936), Johnson (1971), and a combination list she termed the Dolch/Johnson list. Her subjects were 198 first and second graders from two schools differing in socioeconomic level. She was interested in finding out on which list the subjects had the most correct responses and whether grade, sex, or socioeconomic status affected the acquisition of the word lists.

She used three tests in her study based on the previously mentioned word lists: 1) a list of 50 randomly sampled words appearing on the Dolch list but not on the Johnson list, 2) a list of 50 randomly sampled

words appearing on the Johnson list but not on the Dolch list, and 3) a list of 50 randomly sampled words that were common to both Dolch and Johnson's lists.

All three tests were of 50 words presented in a multiple choice format with four possible answers for each word. The tests were group administered during a two week span. Two tests were administered back to back and the third was given a few days later. The order of the administration of the tests was varied to eliminate this as a variable.

Anderson found no significant differences between the tests, but all of the differences that were present favored the combination Dolch/Johnson list. She hypothesized that the reason the Dolch/Johnson list was favored by all the differences was that it included both words which are highly frequent in printed English and also most likely to be found in early readers because of being on the Dolch list which is a primary source for authors. On the other hand, the two separate lists, either Dolch or Johnson, reflect only one or the other of these variables. She also found that girls performed better than boys and that the low socioeconomic subjects out-performed the average-high socioeconomic subjects.

Olson (1965) analyzed the vocabulary of seven primary reading series: 1) Alice and Jerry Basic Readers (O'Donnell et al., 1963), 2) Betts Basic Readers (Betts et al., 1963), 3) Ginn Basic Readers (Russell et al., 1961), 4) New Basic Readers (Robinson et al., 1962), 5) Reading for Meaning Series (McKee et al., 1963), 6) Sheldon Basic Readers (Sheldon et al., 1963), and 7) Winston Basic Readers (Stauffer et al., 1960). His rationale for the study was based on three factors: 1) the extensive criticism of the vocabulary of the texts in the professional literature, 2) the intro-

duction of the field of linguistics into the reading field, and 3) the mobility of the population which caused some students to be exposed to several different reading series within a single grade level.

Olson set up four hypotheses: 1) Similar numbers of words are introduced in the seven series at the pre-primer, primer, and first reader levels; 2) New vocabulary is increased in a smooth and progressive manner within each series from one level to another; 3) There is little difference in the development of the vocabulary from one series to the next; 4) There is a core vocabulary that is the same as the Dolch Basic Sight Vocabulary of 220 Service Words.

The results of his study caused Olson to reject all four of his hypotheses. He found differences in the rate of introduction of new vocabulary as well as in the overall vocabulary loads of the different series. He also found that there was no smooth and progressive introduction of new vocabulary. There was a bombardment of new vocabulary between the third pre-primer and primer levels in all of the series. In addition, he also found that there were a number of words unique to each reading series. Finally, only 35.91 per cent of the words on the Dolch list appeared in five or more of the reading series.

As a consequence of his findings, Olson concluded: 1) The practice of using co-basals to re-expose a student to the vocabulary of the basal at the lower levels studied may actually be doing the poor or below average reader more harm than good; 2) Because of the great increase in vocabulary from the third preprimer to the primer level, more care must be given to selecting basal series to fit the abilities of the students; and 3) It appears no one vocabulary list can be relied upon to give the

students the vocabulary background that will enable them to go from one series to another with ease.

Another study concerned with an examination of a vocabulary list in relation to beginning readers was conducted by Hockett and Neeley (1937). They analyzed 28 first readers and compared the vocabulary loads to the Gates list (1935). They found that in comparing readers published before 1930 and those published between 1930 and 1935 that there was a significant drop in the vocabulary load of the later publications. They also found that approximately five out of every eight words appeared on the first five hundred of the Gates list, and five out of every six were from the first thousand. Finally, of special importance regarding children's learning, they found that the longest reader studied contained five times as much material as the shortest. The largest vocabulary load was more than twice that of the smallest, and the highest average repetition was about four times the lowest. They concluded (in their opening rationale) that teachers must exercise great caution in matching books to children.

In summary, two types of word list studies have been reviewed. First the source of the lists was found to be important when their acquisition by children is considered. Secondly the vocabulary of basals was found to have great variance in both presentation and development and the authors cautioned that teachers be quite careful in matching pupil and text. The Dolch list was found wanting while many of the words in low-level readers were rather high on the Gates list.

Learnability

Studies reported here are arranged chronologically to demonstrate that the concept of learnability is not new and also to show that the concept has been used with various aspects of reading. The construct of learnability as used in this study is defined by the research of E. B. Coleman (1970). Learnability refers to the ease or difficulty with which a subject learns to give a correct response to the graphic symbols representing a word.

One of the earlier studies concerning the learnability of words was conducted by Wiley (1928). Fifty-six first grade subjects were matched according to scores on the Binet test and placed in two classrooms. Text-books adopted by the county were used, and the words studied were the first 60 in the text. The Binet test, county, and texts were not further identified by Wiley. Each new word was developed in a separate period, and three new words were taught each day for four days. After a word had been presented it was added to a flashcard list and kept there for five days and there was a 15-minute drill on the flashcards every day. In addition to this emphasis upon word-recognition there were two 20-minute reading periods with the regular chart material and primers. The subjects were tested individually with flashcards once a week and a learning record was established for each subject for the 60 words. The words were then ranked according to difficulty as measured by the inability of children to recognize them when they were presented on flashcards.

A later study was conducted by Rickard (1935). He studied a list of 119 words based upon the Horn list (1927) and the Gates list (1926). The words were presented in isolation to 207 subjects in first through

third grades. The subjects were presented lists of the 119 words and were given two chances to read each word. The order of difficulty of the words was obtained by tabulating the number of errors for each word.

Another early study was conducted by Wheeler (1938). He used a series of READ-O games constructed from the Gates Vocabulary List for Primary Grades to study the relative difficulty of the 72 words most commonly found in children's reading material. The games were based on a "Bingo" format. The subjects were 227 first graders who were assigned to control and experimental groups according to intelligence. In the experimental group READ-O was played 20 minutes a day during part of the regular reading period; otherwise both groups received the usual types of classroom instruction. The children were tested three times with the 72 words at ten day intervals and the results were tabulated according to the percentage of children immediately recognizing a word. The words were then ranked on the basis of the percentage of children who had learned each word.

In the past decade the learnability construct has been closely associated with E. B. Coleman. Through a series of unpublished papers he developed procedures for scaling words in terms of learnability. In 1970 Coleman's work was published in a monograph titled Collecting a Data Base for a Reading Technology (Coleman, 1970). The present study was based on Coleman's work and for that reason his research will be discussed in detail here.

Coleman (1970) obtained a learnability measure by using 160 words which he decided were "regularly" spelled. The words were chosen from

the 105 that H. D. Jones, one of Coleman's students, found easiest to learn, the 100 most frequently used according to the Thorndike-Lorge (1944) count, the 200 most frequently used by first graders according to Rinsland (1945), plus Coleman added 16 common names and a few missing mates for bipolar adjectives to reach his total word sample of 160 words. His subjects were 150 preschool children between the ages of 48 and 75 months who had had no training in reading. Sixteen words were randomly chosen for each subject from the lists mentioned above. The words were printed on 2 X 3 inch pieces of paper and taught to the subjects over a three day period.

On the first day each subject was taught eight of the words. The words were shuffled and one was drawn and placed before the subject. The experimenter pronounced the word and illustrated it by using it in a sentence. The subject was required to repeat the single word correctly twice. This procedure was followed for all eight words. Then the words were shuffled again and each was presented in isolation and the subject was told, "Tell me what this word says." He was given at least ten seconds to respond. If he did not know the word he was told the word and required to repeat it twice. This procedure continued through the eight words. The entire process was repeated until the subject read a word correctly, then that word was set aside and the process continued until he read all eight words correctly. The eight words were then shuffled again and the entire process was repeated three more times. Thus the subject learned each word to a criterion of four correct responses. The next day, the process was repeated for the subject's other eight words. On the third day, the process was repeated

with all 16 words as a single set. Thus, counting all sessions, the subject learned each of his 16 words to a criterion of eight correct responses.

Each of the 160 words was treated as described above with 15 children. The score for each word was the mean number of incorrect responses by the 15 children. For example, the mean number of errors for the 15 children who learned the word room was 11. For the word bring the mean error score was 17. The words were then ranked according to word class, i.e. interjections, names, nouns, etc., and number of errors per word. Coleman, using the mean error scores of each word class, ranked the word classes in order of difficulty beginning with the easiest as follows: interjections, names, nouns, adjectives, conjunctions, pronouns, prepositions, adverbs, verbs, interrogatives, auxiliaries, and articles. Reported mean error scores ranged from 0 for the word o to 25 for the word then. In short, Coleman found that there was a great difference in learnability among common words. He also studied the relationship between the learnability and frequency of the words; those results are presented in this paper with the review of studies related to frequency.

H.D. Jones (1968), in three studies similar to Coleman's (1970) attempted to rank the most frequently used words according to their ease of "look and say" learning. Jones first studied the 500 most common words in English determined by their average frequency in the Lorge Magazine count and the Lorge-Thorndike-semantic count. After obtaining learnability rankings for the 500 words he then conducted a second experiment with the 105 easiest words in terms of learnability

from his first study. He was interested in increasing the precision of the ratings for these words. He believed that he could increase the precision by varying his method. In his first experiment each child learned five words to a criterion of four correct responses in one session. In his second experiment each child learned 15 words to a criterion of three correct responses in six sessions. Jones thought that ordering effects might have been relatively large in experiment 1 because "The first word or last word shown the child may have been more easily retained, or a word which had particular meaning to an individual child may have been more easily learned. In the second experiment, each child learned 15 words to a more stringent criterion and ordering exerted a relatively smaller effect." (Jones, 1968, pp. 17-18). Because of his suspicion of order effects and a low correlation between Experiments 1 and 2, Jones performed a third experiment involving the 105 words referred to above. The subjects learned 15 words in three sessions to a criterion of three correct responses. He obtained a high correlation between the second and third experiments, which indicated order effects had probably been operating in his first experiment. He also obtained a more precise ranking of the 105 words.

Chester (1971) used Coleman's technique in studying the differences in the learnability of content and function words with high and low socioeconomic subjects. He constructed a master word list based on the first 125 words from Coleman's (1970) ranking of words in terms of learnability. The subjects were controlled for I.Q. Chester found that content and function words were equally learnable. He also found that high socioeconomic subjects learned the words faster than low socio-

economic subjects and that presenting words in an oral context was more effective than presenting them in isolation.

The concept of learnability has not been limited to the ranking of words. Other aspects of reading have been the focus of studies with respect to learnability. Bridge (1968), one of Coleman's students, ranked 35 letters and letter combinations in terms of the ease with which children learn sounds. He used pre-readers. His findings indicated that letters and letter combinations could be ranked according to their learnability. Popp (1964) ranked letters according to their ease of discriminability and A. S. Jones (1968) ranked letters in terms of ease of printing and time necessary for the child to commit them to his memory.

There seems to be at least one question concerning learnability studies which has not been dealt with. The question revolves around what is actually being tested in such studies. Is it the learnability of the word, letter, or what-have-you, or is it the learning ability of the subject, more specifically, the subject's short-term memory, that is being tested? It is this writer's considered opinion that further replication of these studies might provide an answer to this question.

In summary, the studies concerned with learnability indicate that the concept of learnability is not new, but that it has been considered in the past. Words have been ranked according to learnability while letters have been ranked according to discriminability, ease of printing, and time necessary for a child to commit them to memory, in addition to their being ranked in terms of learnability. This writer has reservations concerning just what is being tested in these studies and sees a

need for replication of these studies for further evidence..

Sex Effect

The rationale for including the effect of sex as a variable in this study was that, even though the literature generally cites the superiority of girls regarding reading, how the two sexes would differ on a learnability task with basic words is a question that hasn't been adequately answered. The experimenter also wondered whether some words would be more difficult for one sex than for the other.

The studies reviewed here are organized chronologically in three groups. First, studies showing that the reading achievement of girls is superior to that of the boys are cited. Secondly, those studies showing findings of no differences in this regard are treated. Finally, one study is briefly described which cites cultural differences in reading attributable to sex.

M. Carroll (1948) conducted a study concerning sex differences in reading readiness at the first grade level. She studied the results of the Stone and Grover Classification Test for Beginners in Reading, the Gates Primary Reading Tests, the Monroe Reading Aptitude Test, an unpublished test by Dearborn and Cushman, and the Gates Jim and Judy Tests when they were given to varying groups of children. The total number of children studied was about 1300. She found that all of the significant differences were in favor of the girls. These differences were greatest in the areas of articulation, visual discrimination, and auditory discrimination.

Prescott (1954-55) examined the results of the Metropolitan Readiness Test which was administered to about 15,000 first grade boys and

girls. The total readiness of the children--namely word meaning, sentence meaning, information, visual perception, and motor control--was measured. He found that when chronological age was considered, the performance of girls was better than that of the boys.

I. Balow (1963) administered the Gates Reading Readiness Tests to 302 first grade boys and girls. Six months later he tested these same children again, this time using the Gates Primary Readiness Tests. He found that girls outperformed the boys in both readiness and achievement in the word perception tests.

B. Balow and Rubin (1968) administered the Metropolitan Readiness Test and the Illinois Test of Psycholinguistic Abilities to 638 pre-kindergarten and 570 pre-first grade children. The girls scored higher than the boys on all subtests of the Metropolitan Test except word meaning. Results of the Illinois Test showed no significant sex differences.

Most of the studies with American children concerning the relationship between sex and reading achievement also showed girls' performance was superior to that of boys (Anderson, Hughes, and Dixon, 1956; Gates, 1961; Shellhammer, 1965; and Stanchfield, 1969).

Some investigators have found no differences in the performance of the opposite sexes in reading tasks. Parsley et al. (1963) found a lack of sex differences in using the California Test of Mental Maturity, the California Arithmetic Test, and the California Reading Achievement Test with about 5000 children in grades two to eight.

Dakin (1970), using the Iowa Tests of Basic Skills, the California Reading Tests and an informal cloze test with 263 children whom she

tested yearly from grade four to eight, found no significant differences in the reading ability of boys and girls at each grade level.

Chester (1971), while using Coleman's construct of learnability, found no evidence of sex effects in his pilot study and dropped it from consideration in his study of the learnability of content and function words.

Finally, Johnson (1972) conducted an interesting study which focused on differences in reading achievement due to the sex of subject. He studied the reading ability of males and females in four English-speaking nations: Canada, England, Nigeria, and the United States. His sample included more than a thousand children in grades two, four, and six. He found that in England and Nigeria boys generally scored higher than girls and the sex differences favoring boys increased by sixth grade. In Canada and the United States girls generally scored higher than boys, but the differences favoring girls lessened or disappeared by sixth grade. Johnson concluded that sex differences in reading are culturally related.

In summary, the studies reviewed here present findings of a conflicting nature. On the basis of the evidence, it seems that American girls have sometimes been found superior to American boys with regard to reading ability, but not always. It was one of the purposes of this study to find out if there were differences due to sex in the learnability task as we have found in other areas.

Frequency

Frequency has played a role in studies of paired-associate learning and in studies of meaningfulness of words. These studies are reviewed

first. The present study, however, was concerned with the relationship between frequency and learnability. The literature related to frequency and learnability is presented second.

The concept of frequency is quite broad and this presents a difficulty in understanding what is meant by the term. In addition, the concept of frequency as meaning repetition of exposure to verbal units is intertwined with the concept of frequency as meaning the frequency of occurrence of words in the language itself. It is the last meaning of frequency with which this study is mainly concerned.

Underwood (1959) considered the role of frequency (repetition) in the paired-associate paradigm. Paired-associate learning is composed of a series of items which are presented to a subject who is instructed to learn to say the second member of each pair when the first is presented alone. Previously Thorndike (1932) had concluded that frequency per se was of little importance for establishing a functional connection between two specific items unless there was some sort of reward.

Underwood, concerned with paired-associate learning, wrote:

Frequency is important in verbal learning simply because the most frequent response is most readily available and can therefore be more quickly attached to a new stimulus. Thus frequency is perhaps the single critical variable for the first or recall stage of learning. This hypothesis says nothing about the importance of frequency in the second, or hook-up stage. It may be that mere frequency of contiguous presentation of the two items in a paired-associate list during a laboratory period will also be shown to be critical; but, it was this frequency which Thorndike held to be almost valueless unless accompanied by reward or belonging.

One implication of this frequency hypothesis is that in a paired-associate list the meaningfulness of the stimulus is apt to be relatively unimportant. The experimental facts support this implication to the extent of showing that meaningfulness difference in the response member of paired-associate pairs produces a much greater effect on learning than the same difference in meaningfulness of the stimuli. . . (Underwood, 1959, p. 116).

Noble, (1950, 1952a, 1952b, 1953, 1954) conducted a series of studies concerned with the relationship between meaningfulness, familiarity, and frequency. In his studies he used 96 dissyllables (two-syllable words). His subjects were United States Air Force personnel. He found that frequency was positively related to both meaningfulness and familiarity. As a result he hypothesized that because familiarity and meaningfulness were positively related to frequency, familiarity should also be positively related to meaningfulness. This hypothesis was controversial, especially because some psychologists such as Underwood (1949) even questioned whether meaningfulness and familiarity were distinct concepts. The results of Noble's early work concerned with meaningfulness and familiarity tended to be inconclusive and he suggested that more research be conducted in this area.

De Cecco (1968) also considered the role of frequency in regard to meaningfulness of words. He seemed to tie the concepts of meaningfulness and familiarity together when he wrote:

When we define meaningfulness as the number of different associations elicited by a verbal unit we are defining it as frequency or familiarity. The more frequently a word occurs in the language, the greater its familiarity, and the greater the ease with which it can be attached to other words. In this sense some words are more meaningful than others; kitchen and army are more meaningful than stoma and grapnel (De Cecco, 1968, pp. 334-335).

Several writers have called attention to the relationship between the frequency of appearance in writing and the number of synonyms of words in the English language. Thorndike (1948) and Zipf (1949) have shown this correlation to be a positive one.

In this study paired-associate learning, meaningfulness, and/or familiarity were not considered. Instead, the relationship between frequency and learnability was of prime concern. Frequency has been found to be poorly related to learnability. Wiley (1928) found a correlation of $-.20 \pm .08$ between frequency on the Thorndike list and ease of learning concerning the words he used in his study. Wheeler (1938) also obtained very low correlations and concluded that there is practically no relationship between frequency of use and difficulty of learning. Although Coleman (1970) found that word class affected learnability, he found no significant relationship between a word's frequency of usage and its learnability. H.D. Jones (1968) also found the relationship to be quite low.

In summary, frequency has been of some interest in studies of paired-associate learning and in studies of meaningfulness of words. In studies concerned with learnability of word lists with some derivation from adult materials, frequency has been shown to have a very low relationship. It is considered in this study since the words included in this study are only from basic materials and do not have input from adult materials.

Questions

Studies have shown that words can be ranked according to their learnability. Many studies have also shown girls to be superior to

boys regarding beginning reading ability, but there are some studies that report findings of no significant differences in this regard. Finally, the literature has shown a low relationship between frequency and learnability of words.

The purpose of this study, then, was to answer the following questions:

1. In terms of difficulty, what is the rank-ordering of the first 100 words of the Great Atlantic and Pacific Sight Word List?
2. Are the 100 most frequent words of the Great Atlantic and Pacific Sight Word List differentially difficult for boys and girls?
3. What is the relationship between the learnability and frequency ratings of the first 100 words of the Great Atlantic and Pacific Sight Word List?

Chapter II

METHOD

Subjects

Eight elementary schools from two Northeastern Wisconsin school districts were included in the study. Four of the schools were located in a third class city, two schools were in a fourth class city, and two schools were in small villages. The largest city had a population of 11,343 and the smallest village population was 350.¹ The median number of years of school completed by residents in this geographical area was 12.1 years.² The median income was between \$9,235 and \$10,679 per year while the median home value was between \$14,000 and \$15,800.³ The population of the schools ranged from 117 to 789 (see Table 1).

Kindergarten children served as subjects in this study which was conducted between March 11 and April 6, 1973. In the two school districts there were eight schools containing 21 kindergarten classrooms with a total kindergarten population of 533. Classrooms were sampled through use of a table of random numbers (Beyer, 1968). One hundred thirty-seven boys and one hundred forty-two girls were selected from

¹The State of Wisconsin 1971 Blue Book compiled by the Wisconsin Legislature Reference Bureau, Madison, Wisconsin.

²General Social and Economic Characteristics-Wisconsin. U.S. Department of Commerce, Bureau of the Census, 1970.

³Housing Characteristics for State, Cities, and Counties, Vol. I, Part 51, Wisconsin, 1970. U.S. Department of Commerce, Social and Economic Statistics Bureau, Bureau of the Census.

TABLE 1
LOCATIONS, SCHOOL DISTRICTS, SCHOOLS AND
DEMOGRAPHIC CHARACTERISTICS

Location (Wisconsin)	School District	Elementary School (Population)	Demographic Characteristics
Kaukauna	Kaukauna	Electa Quinney (789)	Third Class City
Kaukauna	Kaukauna	Park (343)	Third Class City
Kaukauna	Kaukauna	Nicolet (312)	Third Class City
Kaukauna	Kaukauna	Victor Haen (580)	Third Class City
Sherwood	Kaukauna	Harrison (117)	Village
Clintonville	Clintonville	Rexford-Longfellow (541)	Fourth Class City
Clintonville	Clintonville	Dellwood (134)	Fourth Class City
Bear Creek	Clintonville	Bear Creek Primary (137)	Village

a total population of 283 boys and 250 girls. It was necessary to sample just the girls in some classrooms since the quota of the boys of approximately 140 was reached earlier than the quota of girls. Thirteen of the 21 classrooms were selected for participation in the study. In three of these classrooms only the girls were sampled, but the total populations of the other ten classrooms were included in this study (see Table 2).

Subjects were matched on the basis of their scores on the Learning Rate Subtest of the Murphy-Durrell Reading Readiness Analysis (Murphy-Durrell, 1965). This test was used because it was very similar to the

TABLE 2
SCHOOLS, CLASSROOMS, SELECTION, AND
ENROLLMENT BY SEX

Schools	Classroom Number	Randomly Selected Classrooms	Number of Boys	Number of Girls
Victor Haen	1	No		
	2	Yes	14	15
	3	Yes	12	14
	4	No		
Nicolet	5	No		
	6	Yes	18	9
	7	No		
Park	8	Yes	17	12
	9	No		
Harrison	10	Yes	12	11
	11	Yes	-	14
Electa Quinney	12	No		
	13	Yes	15	13
Rexford-Longfellow	14	Yes	-	9
	15	No		
	16	Yes	11	7
	17	Yes	-	9
Dellwood	18	No		
	19	Yes	12	6
Bear Creek	20	Yes	11	15
	21	Yes	15	8
TOTALS		13	137	142

task, namely, "look-say" learning, that subjects would later meet in the study. This test is a norm-referenced standardized instrument (see Appendix A). The odd-even reliability coefficient for the subtest is .88. The test was administered to 134 boys and 140 girls between February 27 and March 7, 1973. Three boys and two girls were absent at the time of the test which accounts for the differences between the number of subjects randomly selected on the basis of classrooms for testing and the number actually tested. The raw scores ranged from a perfect score of 18 to the lowest score of two correct. The mean score for the boys was 10.17 and for the girls it was 11.42 (see Table 3).

TABLE 3
LEARNING RATE SUBTEST OF THE MURPHY-DURRELL
READING READINESS ANALYSIS

Number Correct	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean
Boys (134)	0	0	2	2	4	15	12	12	17	13	8	9	12	3	7	6	3	9	10.07
Girls (140)	0	1	0	3	3	9	10	11	14	9	12	15	11	7	8	8	13	7	11.42

The subjects were stratified into five groups according to their test scores (see Table 4). Those subjects who had perfect raw scores of 18 were dropped because the experimenter decided that it was likely that these children could already read (identify numerous sight words) and that the task of the experiment would be too easy; consequently, the results would be invalid. The stratification procedure was done because the experimenter wanted to set up 20 groups of five boys and five girls who were matched as closely as possible with regard to learning ability

as evidenced by their Murphy-Durrell scores. Through the stratification process a subject base was set up from which random group assignments could be made later from the remaining 125 boys and 133 girls.

TABLE 4
STRATIFIED GROUPS ACCORDING TO MURPHY-DURRELL
RAW SCORES AND SEX

Stratified Groups	Group 1	Group 2	Group 3	Group 4	Group 5	Total
Learning Rate Subtest Scores	17-13	12-10*	10-9	8-7	6-3	
Number of Boys	31	24	23	24	23	125
Learning Rate Subtest Scores	17-15	14-12	12-10	9-8	7-4	
Number of Girls	29	27	27	25	25	133

*Random pick of seven subjects from 13 subjects with a raw score of ten (10).

Once the stratified groups were set up, 20 boys and 20 girls from group 1 were selected and assigned to 20 groups through the use of a table of random numbers (Beyer, 1968). The remaining four groups were treated in a like manner. As a result 20 groups of five boys and five girls, which were balanced in terms of their Murphy-Durrell scores, were set up. The group Murphy-Durrell score means ranged from 9.2 to 10.4 for the boys and from 10.4 to 11.4 for the girls. The mean of all the boys' groups was 9.58 and the mean of all the girls' groups was 10.91. The mean of all groups was 10.24 (see Table 5).

The subjects who were not selected from the original five

TABLE 5
RANDOM GROUPS AND MURPHY-DURRELL SCORES AND MEANS OF BOYS, GIRLS, AND COMBINED GROUPS

Murphy-Durrell Scores	Random Groups																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Boy	17	13	13	15	13	16	17	13	13	15	13	15	13	15	15	17	16	15	15	14
Girl	17	17	17	17	16	17	17	16	15	16	16	17	15	15	15	17	15	17	15	16
Boy	12	11	12	11	11	12	12	11	10	12	12	10	10	11	10	11	12	10	10	11
Girl	13	12	13	13	12	13	12	13	13	14	12	14	13	14	12	13	14	12	14	13
Boy	10	9	9	9	10	9	9	9	9	9	10	9	10	9	9	10	9	10	9	9
Girl	12	11	11	11	11	12	10	11	10	11	11	10	10	12	10	11	12	10	10	11
Boy	8	8	7	7	7	7	7	8	7	7	8	8	8	8	8	8	7	7	7	8
Girl	8	8	8	9	9	8	9	9	9	8	8	9	8	8	9	9	9	8	9	9
Boy	3	6	6	5	5	6	3	5	6	6	6	4	6	6	6	6	6	6	5	6
Girl	4	4	7	7	7	7	6	7	7	5	7	6	6	5	6	6	6	7	7	4
Mean Boy Groups	10.0	9.4	9.4	9.4	9.2	10.0	9.6	9.2	9.0	9.8	9.8	9.2	9.4	9.8	9.6	10.4	10.0	9.6	9.2	9.6
Mean Girl Groups	10.8	10.4	11.2	11.4	11.0	11.4	10.8	11.2	10.8	10.8	10.8	11.2	10.4	10.8	11.2	11.2	11.2	10.8	11.0	10.6
Mean Total Groups	10.4	9.9	10.3	10.4	10.1	10.7	10.2	10.2	9.9	10.3	10.3	10.2	9.9	10.3	10.0	10.8	10.6	10.2	10.1	10.1

stratified groups (see Table 4) were randomly ranked in their groups and served as alternates in the study. The ages of those subjects who were included in the study ranged from 65 to 79 months with a mean age of 71.44 months for the boys and from 63 to 78 months with a mean age of 71.27 months for the girls.

In summary, 100 kindergarten boys and 100 kindergarten girls were randomly selected on the basis of their stratified raw scores from the Murphy-Durrell Learning Rate Subtest. Once selected, they were randomly assigned to 20 groups of five boys and five girls each in order to insure equality between groups and representation of varied learning abilities in each group.

Words

The learnability of the 100 most frequent words which appeared in the Great Atlantic and Pacific Sight Word List (actually 1-101 because the 54th word-words was the plural form of the 66th word-word and consequently was dropped) was the focus of this study.

A pilot study was conducted at the Northside School in Sun Prairie, Wisconsin in February, 1973. The results of this study suggested that learning five words was a workable task for kindergarten children. The importance of controlling the cues available to the subject was also learned. For a description of subjects, tasks, and results of the pilot study see appendix B.

As a result of the pilot study the 100 words from the Great Atlantic and Pacific Sight Word List were arranged in alphabetical order and then broken into five groups: Words 1-20; 21-40; 41-60; 61-80; and 81-100.

This was done so that, when later picking one word from each group to form five-word groups, each word in a group would begin with a different initial letter. The length of the words was also considered. The words ranged from one to six letters in length with a mean of 3.39 letters per word (see Table 6).

TABLE 6
LENGTH OF WORDS, FREQUENCY, AND
NUMBER OF LETTERS

Length	Frequency	Total Number of Letters
1 letter	2	2
2 letters	21	42
3 letters	29	87
4 letters	34	136
5 letters	12	60
6 letters	2	12
Totals	100	339

Mean length of words: 3.39 letters

Criteria were set up to control for the length of the words. For each five-word group there could be:

- 1) No more than one (1) one-letter word.
- 2) No more than two (2) two-letter words.
- 3) No more than two (2) three-letter words.

TABLE 7

RANDOM GROUPS ACCORDING TO WORD LENGTH

Random Groups																					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
No. of letters per word	5	2	4	3	3	5	5	3	2	4	3	4	4	3	3	4	4	4	4		
	6	3	5	4	5	2	2	4	5	3	3	3	2	3	4	5	1	4	2		
	4	2	4	5	4	4	2	3	2	3	4	2	5	2	2	3	2	3	3		
	4	4	3	3	4	4	4	4	4	4	2	2	2	4	4	6	4	3	4		
	3	3	3	2	3	5	4	2	4	2	4	4	3	5	1	4	3	5	3		
Total No. of Letters	22	14	19	17	19	18	17	16	17	16	16	15	16	17	14	22	14	19	16		
Group Mean Word Length	4.4	2.8	3.8	3.4	3.8	3.6	3.0	3.4	3.4	3.2	3.4	3.2	3.2	3.4	2.8	4.4	2.8	3.8	3.2		

Total number of letters: 339

Mean length of Words: 3.39 letters

TABLE 8
RANDOMLY SELECTED WORD GROUPS

<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Group 5</u>
which	way	write	your	you
this	then	them	see	over
little	my	out	of	not
how	had	have	first	find
each	at	big	did	could
<u>Group 6</u>	<u>Group 7</u>	<u>Group 8</u>	<u>Group 9</u>	<u>Group 10</u>
use	we	word	when	with
than	there	they	time	these
no	on	other	or	made
from	has	in	him	if
about	can	do	all	by
<u>Group 11</u>	<u>Group 12</u>	<u>Group 13</u>	<u>Group 14</u>	<u>Group 15</u>
very	were	two	would	where
too	the	said	she	some
more	long	make	it	now
her	he	is	go	his
an	and	be	back	as
<u>Group 16</u>	<u>Group 17</u>	<u>Group 18</u>	<u>Group 19</u>	<u>Group 20</u>
will	water	up	was	what
to	people	that	their	so
like	look	just	many	one
I	good	for	into	get
are	day	a	but	down

- 4) No more than two (2) four-letter words.
- 5) No more than one (1) five-letter word.
- 6) No more than one (1) six-letter word.

Using a table of random numbers (Beyer, 1968), the words were assigned to 20 random groups of five words each. Each random group was assigned one word from each of the five 20-word groups set up initially to control for initial letters. As a result each of the five words in a random group began with a different letter. The mean length of the words in each group ranged from 2.8 to 4.4 letters. The overall mean was 3.39 letters (see Tables 7 and 8).

In summary, the 100 words from the Great Atlantic and Pacific Sight Word List were set up in alphabetical order and broken into five groups. Twenty five-word groups of words were randomly formed. Each of these groups contained one word from each of the original five alphabetical groupings. The word groups were controlled for initial letter and length.

Procedure

Once the 20 carefully stratified and randomly selected groups of subjects and the 20 stratified and randomly selected groups of words were set up, each group of subjects was assigned to one of the various word groups through the use of a table of random numbers (Beyer, 1968). Thus each group of words was learned by a group of ten subjects, five boys and five girls, who were matched by sex (one boy-one girl) and their stratified learnability scores. The words were printed in 72 point Futura Demibold style lower-case and put on 3 x 5 inch flashcards.

All testing was done by the experimenter. The study was conducted

in small rooms in the various schools and the subjects were run individually. Initially, each of the five assigned words was presented to the child accompanied by an oral demonstration sentence in which the most frequent usage of that word according to West (1967) was shown (see Appendix C for the list of words and demonstration sentences). An example of the initial presentation follows:

Many: This says many, (experimenter shows the subject the flashcard), as in the sentence, "You have many friends." Can you read many? (Subject response). Good! Would you read it once more? (Subject response).

Then the next word was presented, and the same procedure was used until all five words were presented. After the initial presentation and every presentation thereafter, the words were shuffled to insure random order of presentation. There was one restriction concerning the order of presentation: The last word presented in one trial could not be the first word in the following trial. After the initial presentation of the words and their demonstration sentences, each word was presented on a flashcard in isolation (no demonstration sentence). If the subject could not pronounce the word within ten seconds, the initial presentation format for that word was repeated. Then the next word was presented and this process was continued until all five words had been presented. This procedure was repeated for all five words until the subject could identify all five words as a set without error or until he completed 20 trials with each word.

This study was an improvement over previous learnability studies in that a word was not dropped from further consideration as soon as a subject identified it, but rather the set of five words was repeated until they were all identified in a single trial. This procedure seemed to have

more relevance to "real" learning because a lucky guess did not affect the learnability score of a word.

All errors and successes were recorded on a score sheet (see Appendix D) and the words were ranked according to learnability as established by the error scores of the subjects learning each word (see Table 9 for the error score pattern of a "typical word").

TABLE 9

TRIALS

Word	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Errors
Fool	*0	0	0	0	*X	0	X	0	0	X	X	X	0	X	X	0	X	X	X	X	9

*0 = incorrect

**X = correct

Analysis

All raw test data were coded by the experimenter and delivered to a computer programmer employed at the Wisconsin Research and Development Center for Cognitive Learning.

Correlation coefficients (Hald, 1960) were used to describe the relationships between frequency and learnability, learnability by the individual sexes and learnability by entire sample, and learnability of males with learnability of females. The Wilcoxon Test For Two Matched Samples (Hays, 1963) was used to assess whether there was a difference between the learnability scores of the males and those of the females.

Chapter III

RESULTS AND DISCUSSION

In this chapter the results related to each of the following questions are presented and discussed:

1. In terms of difficulty, what is the rank-ordering of the first 100 words of the Great Atlantic and Pacific Sight Word List?
2. Are the 100 most frequent words of the Great Atlantic and Pacific Sight Word List differentially difficult for boys and girls?
3. What is the relationship between the learnability and frequency ratings of the first 100 words of the Great Atlantic and Pacific Sight Word List?

Question 1

In terms of difficulty, what is the rank-ordering of the first 100 words of the Great Atlantic and Pacific Sight Word List?

See Table 10 for the rank-order of the 100 words and their error scores. The rankings run from easiest to most difficult and the rank for each word was based on the total error scores for five male and five female subjects. The error scores for the words ranged from 16 for the word to to 183 for the word now out of a possible error score of 200. As expected, the words did not rank evenly from 1-100, but rather formed numerous clusters. The clusters offer support for the notion that many words are equally learnable.

Table 10 shows some rankings which seem out of place since it has been previously shown that th- words should be quite difficult (Coleman,

1970) and, on the surface at least, one would think that short (two letters) words would be easier than long (five and six letters) words. One might speculate, too, that words beginning with blends and digraphs would be more difficult than words beginning with a single consonant. Such was not the case with many words. For example, the word there, which is ranked 44.5, seems out of place when compared with other th-words which are ranked from 57 to 95. A check with Table 8 shows that the group in which this word appeared probably affected its learnability because there were two words of two letters and two words of three letters accompanying the five-letter word there. Thus there probably was learned relatively easily because of its prominence in the group.

Other examples of words with somewhat surprising ranks are: which (4), water (5), would (7), people (21), write (38), do (62), at (74), my (77), and as (92). The words which, water, would, people, and write were the only words in their groups which had their length. This should not have caused their low rankings because some other words in their groups had only one less or one more letter than the words in question. Therefore, the reason for their low rankings is open for conjecture. The words do, at, my, and as had rather high rankings. In every case there were other words of similar length in their groups, but it still seems reasonable to have expected these two-letter words to have lower rankings because of their length. It is possible that some of the longer words provided more concrete concepts to the subjects than some shorter words and subsequently were remembered more easily. The discussion concerning question two which follows might give some justification for these unexpected rankings.

TABLE 10

RANK-ORDER OF THE FIRST 100 WORDS OF THE
GREAT ATLANTIC AND PACIFIC SIGHT WORD LIST IN TERMS OF DIFFICULTY

<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>	<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>	<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>
1	to	16	35	make	82	68	many	123
2.5	big	19	36	time	85	69.5	this	125
2.5	a	19	39	on	89	69.5	how	125
4	which	20	39	write	89	73	get	128
5	water	27	39	like	89	73	some	128
6	too	37	39	or	89	73	and	128
7.5	would	38	39	it	89	73	at	128
7.5	I	38	42	when	91	73	than	128
9.5	up	43	44.5	there	93	76	that	130
9.5	no	43	44.5	look	93	77	my	132
11	in	45	44.5	said	93	78.5	into	135
12.5	see	46	44.5	an	93	78.5	word	135
12.5	first	46	47	of	95	80	then	136
14	be	50	48	we	98	81.5	have	137
15	she	51	49	just	100	81.5	find	137
16	little	52	50	but	104	83	her	141
17.5	two	55	51	had	104	84.5	his	143
17.5	out	55	52.5	not	105	84.5	them	143
20	long	60	52.5	use	105	86	the	145
20	will	60	54.5	way	108	87	with	147
20	people	60	54.5	he	108	88.5	what	149
22	for	61	56	good	109	88.5	more	149
23	is	68	57	these	111	90	their	150
25.5	so	71	58	over	115	91	very	151
25.5	go	71	60.5	each	116	92	as	152
25.5	day	71	60.5	your	116	93	from	153
25.5	are	71	60.5	made	116	94	were	154
28	one	72	60.5	do	116	95	they	156
29	you	72	63	all	118	96	could	158
30	down	74	64.5	was	119	97.5	where	161
31	back	76	64.5	did	119	97.5	other	161
32.5	if	80	66	has	120	99	about	165
32.5	can	80	67	him	122	100	now	183
34	by	81						

Question 2

Are the 100 most frequent words of the Great Atlantic and Pacific Sight Word List differentially difficult for boys and girls?

See Tables 11 and 12 for the learnability rankings for males and females. The rankings run from easiest to most difficult, and the ranks for each word were based on the total error score of either five male or female subjects. The reader must be cautioned that the reliability of these rankings is open to question because the sample was rather small though carefully selected and stratified according to learning ability. The error scores for the males ranged from eight for the word which to 92 out of a possible 100 for the word other and for the females from five for the word to to 93 out of a possible 100 for the word now. The correlation coefficient for the two tables was .67. Using the t Test for Correlations (Hays, 1963) the result is significant ($p < .01$).

Some words showed wide variances in ranks between the two tables. For example, the word on was ranked 15 on the table for males and 78.5 on the table for females, a difference of 63.5 ranks. Since both sexes were administered the same treatment, i.e., word group, the treatment effects should have been equal. Upon examination of the subject grouping it was found that the girl with the highest Murphy-Durrell score in her group had a very high error score (18) for the word on while the male with the lowest Murphy-Durrell score in his group had a very low error score (3).

The following words showed differences of 42.5 to 58 ranks between the sexes: than (58), this (57), word (57), he (56), there (48), and (47), use (43.5), and day (42.5). Because the treatment effects were

TABLE 11

RANK-ORDER OF THE FIRST 100 WORDS OF THE GREAT ATLANTIC
AND PACIFIC SIGHT WORD LIST IN TERMS OF DIFFICULTY BY MALES

<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>	<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>	<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>
1	which	8	35	use	41	68	as	66
2	would	9	36	when	44	69	way	67
3.5	to	11	38	this	45	71	good	68
3.5	no	11	38	than	45	71	him	68
5.5	a	12	38	it	45	71	do	68
5.5	big	12	41	if	46	73.5	get	69
7	up	14	41	said	46	73.5	made	69
8	see	17	41	of	46	76	into	71
9	I	18	44	an	47	76	that	71
10	long	19	44	time	47	76	her	71
11	water	21	44	are	47	79	then	72
12.5	she	22	46.5	one	48	79	with	72
12.5	too	22	46.5	these	48	79	my	72
15	out	25	48.5	just	49	81	more	74
15	on	25	48.5	had	49	83	many	76
15	in	25	51	not	50	83	he	76
17	be	27	51	make	50	83	at	76
18	first	28	51	has	50	85	where	77
19	back	30	53	day	51	87	about	78
20.5	for	31	54.5	each	55	87	from	78
20.5	can	31	54.5	over	55	87	have	78
23	so	32	56.5	write	56	89	them	79
23	there	32	56.5	look	56	90	could	80
23	little	32	58.5	like	57	91	very	81
25.5	or	33	58.5	did	57	92	and	82
25.5	will	33	60	how	59	93	they	85
27	you	34	61	but	60	94	that	87
28	down	36	63	some	61	95	the	88
29	people	38	63	your	61	96	their	89
31	two	39	63	all	61	97.5	now	90
31	by	39	65	was	62	97.5	were	90
31	go	39	66	his	64	99	word	91
33.5	is	40	67	find	65	100	other	92
33.5	we	40						

TABLE 12

RANK-ORDER OF THE FIRST 100 WORDS OF THE GREAT ATLANTIC
AND PACIFIC SIGHT WORD LIST IN TERMS OF DIFFICULTY BY FEMALES

<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>	<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>	<u>Rank</u>	<u>Word</u>	<u>No. of Errors</u>
1	to	5	34	you	38	68.5	my	60
2	water	6	36	so	39	68.5	over	60
3.5	a	7	38	good	41	71	their	61
3.5	big	7	38	way	41	71	each	61
5	which	12	38	long	41	71	there	61
6	too	15	40	by	42	73.5	what	62
7	two	16	42	word	44	73.5	did	62
8	first	18	42	but	44	75	these	63
10.5	I	20	42	it	44	78.5	into	64
10.5	in	20	45	back	46	78.5	then	64
10.5	little	20	45	and	46	78.5	were	64
10.5	day	20	45	an	46	78.5	on	64
13	people	22	48.5	many	47	78.5	use	64
14	be	23	48.5	made	47	78.5	them	64
15.5	one	24	48.5	said	47	82	how	66
15.5	are	24	48.5	when	47	83	some	67
17	will	27	51	do	48	84	other	69
18	is	28	52	can	49	86	her	70
20.5	see	29	53	of	49	86	very	70
20.5	she	29	54	just	51	86	has	70
20.5	would	29	55	at	52	88	they	71
20.5	up	29	56	him	54	89	find	72
23.5	out	30	58	had	55	91	more	75
23.5	for	30	58	not	55	91	with	75
27	no	32	58	your	55	91	from	75
27	he	32	60	or	56	93	could	78
27	go	32	62	was	57	94	his	79
27	like	32	62	the	57	95	this	80
27	make	32	62	all	57	96	than	83
30	write	33	64	we	58	97	where	84
31	if	34	66	get	59	98	as	86
32	look	37	66	that	59	99	about	87
34	down	38	66	have	59	100	now	93
34	time	38						

similar for both groups, the differences in ranks must be due to differences in the subject groupings and/or differences in the learnability of the words due to sex. An examination of Table 13 shows that some subjects did not perform as expected according to their Murphy-Durrell Learning Rate Subtest (Murphy and Durrell, 1965) scores.

For example, an examination of the error scores and Murphy-Durrell scores of the subjects for the word than showed that the error scores for the fourth- and fifth-ranked males totaled 15, while those for the fourth- and fifth-ranked females totaled 39. For the word this, the third-ranked male did very well while the second- and third-ranked females did rather poorly. In the other cases depicted in Table 12 similar situations occurred. It is evident that one or two deviant scores had an exaggerated effect on the overall group ranking because the sample was small. The mean variance in ranks between males and females was 17.88. In any event, even after one allows for the variance due to the subject groupings, it seems plausible that some words were much easier for males than for females, and vice versa as can be seen in Tables 11 and 12. The reasons for these differences are open to conjecture. The overall mean error score for males was 51.39 and it was 47.86 for the females. The Wilcoxon Matched Pairs Test (Hays, 1963) was used to test across all groups concerning whether there was a difference between the sexes regarding their learning ability with the 100 words (see Table 14 for words and their error score means according to sex). No significant difference was found ($P < .18$). The finding of no significant difference with these kindergarten subjects might be relevant to those interested in studying the effect of culture on reading as

COMPARISON OF MURPHY-DURRELL SCORES AND ERROR SCORES
OF MALES AND FEMALES FOR SELECTED WORDS

Word	Males			Females			Word	Males			Females		
	M-D*	E**		M-D*	E**			M-D*	E**		M-D*	E**	
<u>than</u>	1. 16	9		1. 17	12		<u>use</u>	1. 16	3		1. 17	7	
	2. 12	17		2. 13	15			2. 12	18		2. 13	10	
	3. 9	4		3. 12	17			3. 9	10		3. 12	11	
	4. 7	10		4. 8	20			4. 7	8		4. 8	20	
	5. 6	<u>5</u>		5. 7	<u>19</u>			5. 6	<u>2</u>		5. 7	<u>16</u>	
Total		45			83		Total		41			64	
<u>word</u>	1. 13	14		1. 16	0		<u>he</u>	1. 15	6		1. 17	1	
	2. 11	17		2. 13	5			2. 10	19		2. 14	3	
	3. 9	20		3. 11	9			3. 9	19		3. 10	20	
	4. 8	20		4. 9	10			4. 8	13		4. 9	5	
	5. 5	<u>20</u>		5. 7	<u>20</u>			5. 4	<u>19</u>		5. 6	<u>3</u>	
Total		91			44		Total		76			32	
<u>there</u>	1. 17	2		1. 17	12		<u>and</u>	1. 15	8		1. 17	0	
	2. 12	11		2. 12	9			2. 10	14		2. 14	1	
	3. 9	5		3. 10	20			3. 9	20		3. 10	20	
	4. 7	10		4. 9	0			4. 8	20		4. 9	19	
	5. 6	<u>4</u>		5. 6	<u>20</u>			5. 4	<u>20</u>		5. 6	<u>6</u>	
Total		32			61		Total		82			46	
<u>day</u>	1. 16	0		1. 15	1								
	2. 12	6		2. 14	0								
	3. 9	9		3. 12	1								
	4. 7	18		4. 8	12								
	5. 6	<u>18</u>		5. 6	<u>6</u>								
Total		51			20								

* Murphy-Durrell Scores

** Error Scores

WORDS, GROUP ERROR SCORES AND MEANS BY SEX

Group 1			Group 2			Group 3			Group 4			Group 5		
Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score
which	8	12	way	67	41	write	56	33	your	61	55	you	34	38
this	45	80	then	72	64	them	79	64	see	17	29	over	55	60
little	32	20	my	72	60	out	25	30	of	46	49	not	50	55
how	59	66	had	49	55	have	78	59	first	28	18	find	65	72
each	55	61	at	76	52	big	12	7	did	57	62	could	80	78
Total	199	239	Total	336	272	Total	250	193	Total	209	213	Total	284	303
Mean	39.9	47.8	Mean	67.2	54.4	Mean	50	38.6	Mean	41.8	42.6	Mean	56.8	60.6

Group 6			Group 7			Group 8			Group 9			Group 10		
Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score
use	41	64	we	40	58	word	91	44	when	44	47	with	72	75
than	45	83	there	32	61	they	85	71	time	47	38	these	48	63
no	11	32	on	25	64	other	92	69	or	33	56	made	69	47
from	78	75	has	50	70	in	25	20	him	68	54	if	46	34
about	78	87	can	21	49	do	68	48	all	61	57	by	39	42
Total	253	341	Total	178	302	Total	361	252	Total	253	252	Total	274	261
Mean	50.6	68.2	Mean	35.6	60.4	Mean	72.2	50.4	Mean	50.6	50.4	Mean	54.8	52.2

(Table 14 continued on following page)

Group 11			Group 12			Group 13			Group 14			Group 15		
Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score
very	81	70	were	90	64	two	39	16	would	9	29	where	77	84
too	22	15	the	88	57	said	46	47	she	22	29	some	61	67
more	74	75	long	19	41	make	50	32	it	45	44	now	90	93
her	71	70	he	76	32	is	40	28	go	39	32	his	64	79
an	47	46	and	82	46	be	27	23	back	30	46	as	66	86
Total	295	276	Total	355	242	Total	202	146	Total	145	180	Total	358	409
Mean	59.0	55.2	Mean	71.0	48.4	Mean	40.4	29.2	Mean	29.0	36.0	Mean	71.6	81.8

Group 16			Group 17			Group 18			Group 19			Group 20		
Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score	Word	Male Score	Female Score
will	33	27	water	21	6	up	14	29	was	62	57	what	87	62
to	11	5	people	38	22	that	71	59	their	89	61	so	32	39
like	57	32	look	56	37	just	49	51	many	76	47	one	48	24
I	18	20	good	68	41	for	31	30	into	71	64	get	69	59
are	47	24	day	51	20	a	12	7	but	60	44	down	36	38
Total	166	108	Total	234	126	Total	177	176	Total	358	273	Total	272	222
Mean	33.2	21.6	Mean	46.8	25.2	Mean	35.4	35.2	Mean	71.6	54.6	Mean	54.4	44.4

Overall Mean of Boys' Groups 51.39
Overall Mean of Girls' Groups 47.86

Johnson (1972) has done. It might be plausible that the effects of the American culture have their greatest impact only after a child has been placed in a structured reading program.

Question 3

What is the relationship between the learnability and frequency ratings of the first 100 words of the Great Atlantic and Pacific Sight Word List?

No relationship was found between the learnability and frequency rankings of the words. The correlation coefficient (Hald, 1960) was $-.007$ and was not significant (see Table 15 for the learnability and frequency rankings). This result was expected because Wiley (1928), Wheeler (1938), Jones (1968), and Coleman (1970) had found little, if any, relationship. The rationale for considering the relationship between frequency and learnability in this study in view of the previous findings of little or no relationship centered around the make-up of the Great Atlantic and Pacific Sight Word List (Otto & Chester, 1972). This list was derived from third grade materials. All of the other lists which have been the subject of learnability studies had some, if not most, derivation from "adult" materials. Therefore the question was considered to see if a select group of basic words would show a different relationship to frequency because of their usage at such a low level.

Which List to Use

Three lists have been presented in table form, 1) learnability ranks of the 100 words for males and females combined (Table 10), 2) learnability ranks of the 100 words for males only (Table 11), and 3) learnability

TABLE 15

LEARNABILITY AND FREQUENCY RANKS OF THE FIRST 100
WORDS OF THE GREAT ATLANTIC AND PACIFIC SIGHT WORD LIST

Rank	Word	Frequency Rank	Rank	Word	Frequency Rank	Rank	Word	Frequency Rank
1	to	3	35	make	61	68	many	44
2.5	big	89	36	time	76	69.5	this	27
2.5	a	2	39	on	13	69.5	how	37
4	which	74	39	write	52	73	get	82
5	water	67	39	like	56	73	some	50
6	too	95	39	or	48	73	and	4
7.5	would	66	39	it	10	73	at	21
7.5	I	17	42	when	36	73	than	96
9.5	up	43	44.5	there	34	76	that	11
9.5	no	80	44.5	look	86	77	my	79
11	in	6	44.5	said	20	78.5	into	62
12.5	see	57	44.5	an	73	78.5	word	65
12.5	first	92	47	of	5	80	then	46
14	be	31	48	we	45	81.5	have	23
15	she	24	49	just	88	81.5	find	85
16	little	68	50	but	33	83	her	47
17.5	two	69	51	had	29	84.5	his	19
17.5	out	49	52.5	not	35	84.5	them	51
20	long	84	52.5	use	98	86	the	1
20	will	42	54.5	way	93	87	with	18
20	people	72	54.5	he	9	88.5	what	25
22	for	14	56	good	97	88.5	more	77
23	is	8	57	these	60	90	their	53
25.5	so	58	58	over	94	91	very	90
25.5	go	81	60.5	each	41	92	as	22
25.5	day	99	60.5	your	39	93	from	30
25.5	are	15	60.5	made	87	94	were	38
28	one	26	60.5	do	40	95	they	16
29	you	7	63	all	28	96	could	75
30	down	78	64.5	was	12	97.5	where	100
31	back	91	64.5	did	71	97.5	other	64
32.5	if	59	66	has	70	99	about	54
32.5	can	32	67	him	63	100	now	83
34	by	55						

ranks for females only (Table 12). For instructional purposes, the Combined List (Table 10) seems to have the most to offer.

It has been previously pointed out that some words were ranked quite differently by males and females. It also has been pointed out that two factors might have caused this: First, some subjects seemingly did not achieve up to expectation, and secondly, the words themselves might have some inherent attributes which cause them to be learned more easily or more difficultly by each sex. Only replications of this study on varying populations can show whether the difference due to sex is accountable by the learnability of the words or the learning ability of the subjects. In any case, the Combined List is based on the total scores of both sexes and is not influenced as much by deviant scores.

As a result of combining the lists of words ranked by males and females to form the Combined List, the relationships between the lists according to sex and the Combined List are very high. The correlation coefficient (Hald, 1960) for the learnability ranks of the Combined List and those of the male list is .92 and significant ($p < .01$) according to the t Test for Correlations (Hays, 1963). Using the same statistical procedures, the correlation coefficient for the learnability ranks of the Combined List and those of the female list is .90 ($p < .01$). Therefore, it seems reasonable to use the Combined List for instructional purposes.

Chapter IV

SUMMARY, CONCLUSIONS, LIMITATIONS, AND RESEARCH IMPLICATIONS

Summary

This study was designed to rank the first 100 words of the Great Atlantic and Pacific Sight Word List according to learnability. The differences in the learnability rankings of the words due to sex and the relationship between the learnability and frequency rankings of the words were also examined.

Subjects in the study were 200 kindergarten pupils enrolled in eight northeastern and central Wisconsin elementary schools. All subjects were chosen through a random selection of classrooms. The subjects were administered the Murphy-Durrell Reading Readiness Analysis: Learning Rate Subtest. The subjects were then stratified according to their Murphy-Durrell scores and randomly assigned to 20 groups.

The first 100 words of the Great Atlantic and Pacific Sight Word List were arranged in alphabetical order and broken into five groups: Words 1-20; 21-40; 41-60; 61-80; and 81-100. Then the words were randomly assigned to 20 groups of five words each. The assignment of the words was controlled for both initial letters and length of the words. The 20 groups of words were then randomly assigned to the 20 groups of subjects. In the study each word was learned by ten subjects of whom five were male and five were female.

Each word was presented on a flashcard accompanied by an oral sentence

which illustrated the most frequent usage of that word. Later the words were presented in isolation and if the subject did not respond correctly in ten seconds, the initial treatment with the oral sentence was repeated. The order of presentation was randomized each time and there were a possible 20 trials. The criterion was one successful identification of all five words and correlation coefficients and the Wilcoxon Test for two matched samples were used to analyze the data. The first 100 words of the Great Atlantic and Pacific Sight Word List were ranked according to their learnability and numerous clusters of ranks were found.

Conclusions

The following conclusions seem warranted on the basis of the results of this study.

1. A rank-order of the first 100 words of the Great Atlantic and Pacific Sight Word List in terms of learnability has been determined.
2. The sex of the subject seems to be related to the learnability of some words, but the real significance of this relationship is open to question. There was no significant difference in overall learning by males and females.
3. There is no relationship between the frequency and learnability rankings of the words.

Limitations

All conclusions drawn from this study are applicable only to populations possessing similar characteristics to those of the selected subjects in this study. These children were white middle-class kindergarteners from four semi-rural cities and villages who had not experienced formal reading instruction.

Furthermore, all conclusions drawn from this study regarding the learnability rankings of the words are applicable only to situations of "look-say" learning. This is a specialized form of serial learning in which the subject learns a number of words through repeated presentations of these words. Word-attack strategies are not taught to the subjects before the words are presented. The aim of this instruction is to provide a basic sight vocabulary which will permit a focus on meaning as well as decoding in early reading and serve as a basis for analytic phonics instruction (Otto and Chester, 1972, p. 435).

Research Implications

This investigation has provided a rank-order of the first 100 words of the Great Atlantic and Pacific Sight Word List in terms of learnability. The reliability of such a rank-order can only be determined by further replications of this study and/or other studies on populations similar to that used in this study and also populations which differ, i.e., race, socioeconomic characteristics, location, etc. It is also only through such replications that we can evaluate whether or not we are testing the learning ability of the child or the learnability of the words.

Replication of this study might also provide more information concerning whether, first of all, there is a significant difference in the overall performance of boys and girls on learnability tasks, and secondly, whether there is something inherent in some of the words themselves which make them easier or more difficult for persons of different sexes. The reverse of this question might also be studied, namely, that there might be something inherent in the subjects attributable to their sex which would account for the fact that the word he was ranked 27th for the females and 83rd for the males. Could it all be attributable to the girls' interest in boys?

Further studies should be conducted with the words considered in this study as well as more of the words on the Great Atlantic and Pacific Sight Word List. If possible, larger samples of subjects should be used to increase the reliability of the results. Through such replications the effectiveness of teachers might be increased and an empirical basis might be established for those interested in controlling vocabulary in published materials.

Finally, further research of the 100 words in this study might consider adding the following criteria in their assignment of words to groups: In each group there should be at least one, two-letter word; one, three-letter word; and one, four-letter word (see page 21 for the criteria and Table 6).

References

- Anderson, I., Hughes, B., & Dixon, W. Age of learning to read and its relation to sex, intelligence, and reading achievement in the sixth grade. Journal of Educational Research, 1956, 49, 447-53.
- Anderson, J. A comparative study of three basic sight word lists: Dolch, Johnson, and Dolch/Johnson. Unpublished Master's Thesis, University of Wisconsin - Madison, 1973.
- Balow, B., & Rubin, R. A comparison of pre-kindergarten and pre-first grade boys and girls on measures of school readiness and language development. ERIC, 1968, ED 023474.
- Balow, I. Sex differences in first grade reading. Elementary English, 1963, 40, 303-306, 320.
- Betts, E. et al. Betts basic readers. New York: American Book, 1963.
- Beyer, W. H. (Ed.) Handbook of tables for probability and statistics. (2nd ed.) Cleveland: The Chemical Rubber Company, 1968.
- Bridge, J. T. Rank-ordering of letters and letter combinations according to ease of learning their sound associations. Unpublished Master's Thesis, University of Texas at El Paso, 1968.
- Carroll, J. B., Davies, P., & Richman, B. Word Frequency Book. Boston: Houghton Mifflin, 1971.
- Carroll, N. W. Sex differences in reading readiness at the first grade level. Elementary English, 1948, 25, 370-75.
- Chester, R. B. Differences in learnability of content and function words presented in isolation and oral context when taught to high and low socioeconomic level subjects. Unpublished Doctoral Dissertation, University of Georgia, 1971.
- Coleman, E. B. Collecting a data base for a reading technology. Journal of Educational Psychology, 1970, 61, No. 4, Part 2.
- Dakin, K. E. Carlson. A longitudinal study of sex differences in reading achievement in grades four through eight. ERIC, 1970, ED 044258.
- De Cecco, J. P. The psychology of learning and instruction; Educational psychology. Englewood Cliffs, N.J.: Prentice Hall, 1968.
- Dolch, E. A basic sight vocabulary. Elementary School Journal, 1936, 36, 456-60.

- Gates, A. I. A reading vocabulary for the primary grades. New York: Teachers College, Columbia University, 1926.
- Gates, A. I. Sex differences in reading ability. Elementary School Journal, 1961, 61, 431-434.
- Hald, A. Statistical theory with engineering applications. New York: John Wiley and Sons, 1960.
- Hays, W. Statistics. New York: Holt, Rhinehart and Winston, 1963.
- Hockett, J. & Neeley, N. The vocabularies of twenty-eight first readers. Elementary School Journal, 1937, 37, 344-52.
- Horn, M. C. The thousand and three words most frequently used by kindergarten children. Childhood Education, 1927, 3, 119.
- Johnson, D. A basic vocabulary for beginning reading. Elementary School Journal, 1971, 72, 29-34.
- Johnson, D. An investigation of sex differences in reading in four English-speaking nations. Wisconsin Research and Development Center for Cognitive Learning, Technical Report No. 209, 1972
- Jones, A. S. Rank-ordering of letters according to ease of printing. Unpublished Master's Thesis, University of Texas at El Paso, 1968.
- Jones, H. D. A rank-ordering of common words according to their ease of look-say learning. Unpublished Master's Thesis, University of Texas at El Paso, 1968.
- McKee, P. et al. Reading for meaning series. Boston: Houghton Mifflin, 1963.
- Murphy, H. & Durrell, D. Murphy-Durrell Reading Readiness Analysis. New York: Harcourt, Brace & World, 1965.
- Noble, C. E. Absence of reminiscence in the serial rote learning of adjectives. Journal of Experimental Psychology, 1950, 40, 622-31.
- Noble, C. E. An analysis of meaning. Psychological Review, 1952, 59, 421-30. (a)
- Noble, C. E. The role of stimulus meaning (m) in serial verbal learning. Journal of Experimental Psychology, 1952, 43, 437-46. (b)
- Noble, C. E. The meaning-familiarity relationships. Psychological Review, 1953, 60, 89-98.
- Noble, C. E. The familiarity-frequency relationship. Journal of Experimental Psychology, 1954, 47, 13-16.

- O'Donnell, M. et al. Alice and Jerry basic readers. New York: Harper and Row, 1963.
- Olson, A. An analysis of the vocabulary of seven primary reading series. Elementary English, 1965, 42, 261-64.
- Otto, W., & Chester, R. Sight words for beginning readers. Journal of Educational Research, 1972, 65, 435-443.
- Parsley, K. M., Powell, M., O'Connor, H. A., & Deutsch, M. Are there really sex differences in achievement? Journal of Educational Research, 1963, 57, 210-12.
- Popp, H. M. Visual discrimination of alphabet letters. The Reading Teacher, 1964, 17, 221-225.
- Prescott, G. A. Sex differences in metropolitan readiness test results. Journal of Educational Research, 1954-55, 48, 605-610.
- Rickard, G. E. The recognition vocabulary of primary pupils. Journal of Educational Research, 1935, 29, 281-292.
- Rinsland, H. D. A basic vocabulary of elementary school children. New York; Macmillan, 1945.
- Robinson, H. et al. New basic readers. Chicago: Scott Foresman, 1962.
- Russell, D. et al. Ginn basic readers. Boston: Ginn, 1961.
- Sheldon, W. et al. Sheldon basic readers. Boston: Allyn and Bacon, 1963.
- Shellhammer, T. Girls outperform boys in state tests results. California Education, 1965, 2, 25-6.
- Stanchfield, J. M. Differences in learning patterns of boys and girls. ERIC, 1968 ED 033000.
- Stauffer, R. et al. Winston basic readers. New York: Holt, Rhinehart, and Winston, 1960.
- Thorndike, E. L. The fundamentals of learning. New York: Teachers College, Columbia University, 1932.
- Thorndike, E. L. On the frequency of semantic changes in modern English. Journal of General Psychology, 1948, 39, 23-27.
- Thorndike, E. L., & Lorge, I. The teacher's word book of 30,000 words. New York: Teachers College, Columbia University, 1944.
- Underwood, B. J. Experimental Psychology. New York: Appleton-Century-Crofts, 1949.

- Underwood, B. J. Verbal learning in the educative process. Harvard Educational Review, 1959, 29, 107-17.
- West, M. A general service list of english words. London: Longmans, Green and Co., 1967.
- Wheeler, L. R. A study of the relative difficulty of a primary reading vocabulary. Pedagogical Seminary and Journal of Genetic Psychology, 1938, 52, 183-201.
- Wiley, W. E. Difficult words and the beginner. Journal of Educational Research, 1928, 17, 278-289.
- Zipf, G. K. Human behavior and the principle of least effort. Cambridge, Mass: Addison-Wesley, 1949.

APPENDIX A

Learning Rate Test

Before starting to administer this test, print the following words on the board in three rows:

tongue	hair	eyes
walk	fly	swim
round	clean	heavy

Flash cards containing the same words, needed in the administration of the test, are included in each package of tests. They should be cut apart to make nine separate cards.

- To teach the first row of words: *tongue, hair, eyes*
SAY TO PUPILS:

1. These words are names of things we all have.

Point to words on the board each time you name them.

The words are *tongue, hair, eyes*. Say them after me while I point to them: *tongue, hair, eyes*. Say them again: *tongue, hair, eyes*.

2. Show me this.

Point to word *tongue* — pause — then stick out your own tongue.

Good. Everybody has a tongue. What is the word?

Point to *tongue*.

Tongue, yes.

Encourage group response to all questions; do not question individuals.

3. Put your hand on your hair.

Point to word *hair* on the board and put your hand on your own hair.

Yes, you have hair on your head. What is the word?

Point to *hair*.

Yes, *hair*. And what is this word?

Point to *tongue*

Yes, *tongue*.

4. Shut your eyes.

Point to *eyes* on the board and shut your own eyes.

Now open your eyes. What is this word?

Point to *eyes*.

Yes, *eyes*. And this one?

Point to *hair*.

Yes, *hair*. And this one?

Point to *tongue*.

Yes, *tongue*. Now read all of the words again.

Point to each word, pause for children's answers, then repeat *tongue, eyes, hair*.

Using the flash cards, SAY:

5. Now I'll show you the same words on cards.

Show card for *hair*; hold it below *hair* on the board.

What is this word? Yes, *hair*. See, *hair*.

Show card for *eyes*; hold it below *eyes* on the board.

What is this word? Yes, *eyes*. See, *eyes*.

Show card for *tongue*; hold it below *tongue* on the board.

What is this word? Yes, *tongue*. See, *tongue*.

6. Now let's see if you know all of these words on the cards.

Show each card in turn, away from the board.

This word is . . . *eyes*.

This word is . . . *tongue*.

This word is . . . *hair*.

7. Now I'll ask you some questions about these words.

Show *eyes*.

Do cats have these? . . . Yes, cats have eyes.

Does a dog have this?

Show *hair*.

Yes, a dog has hair.

Show *tongue*.

Do you have this? . . . Yes, you have a tongue.

8. Now let's see if you can find these words on your paper. Put your markers under the words in the first box.

Make sure all markers are in the right place.

Show card with *eyes*.

In the first row, put a cross on this word . . . *eyes*.

Show card with *tongue*.

In the next row, put a cross on this word . . . *tongue*.

Show card with *hair*.

In the next row, put a cross on this word . . . *hair*.

- To teach the second row of words: *walk, fly, swim*
SAY:

1. These are ways to move.

Point to board.

They are *walk, fly, swim*. Say them after me: *walk, fly, swim*.

2. Here is *walk*.

Point to *walk*.

People can walk; horses can walk; any animal that has feet can walk. Of course, a little baby can't walk, but he learns to walk when he is older. Some people walk fast; some walk slowly. This word always says *walk*. What is the word? Yes, *walk*.

3. Here is *swim*.

Point to *swim*.

Fish can swim; frogs can swim; some dogs can swim; and many people can swim. You can swim in lakes and swimming pools. This word always says *swim*. What is the word? Yes, *swim*, and what is this word?

Point to *walk*.

Yes, *walk*.

4. This word is *fly*.

Point to *fly*.

Birds can fly; airplanes can fly; kites can fly in the wind. You and I can't fly except in an airplane. This word always says *fly*. What is the word? Yes, *fly*. And this one?

Point to *swim*.

Yes, *swim*. And this one?

Point to *walk*.

Yes, *walk*.

Using the flash cards, SAY:

5. Now here are the same words on cards.

Show *swim*; hold it below *swim* on the board.

What is this word? Yes, *swim*. See, the two are alike, *swim*.

Show *walk*; hold it below *walk* on the board.

What is this word? Yes, *walk*. See, it is *walk*.

Show *fly*; hold it below *fly* on the board.

What is this word? Yes, *fly*. See, it is *fly*.

6. Now let's see if you can remember all of these words on the cards.

Show each one in turn: *fly*, *walk*, *swim*.

This word is . . . *fly*.

And this one is . . . *walk*.

And this one is . . . *swim*. Good.

7. Now I'll ask you questions about these words.

Show *walk*:

Can you do this? . . . Yes, you can walk.

Show *fly*.

Can a cat do this? . . . No, a cat can't fly.

Show *swim*.

Can a fish do this? . . . Yes, a fish can swim.

8. Now let's see if you can find these words on your paper. Put your markers under the words in the next box.

See that each pupil has the right place. Show the card with *swim*.

Find *swim* and put a cross on it.

Show card with *walk*.

Move your marker to the next row, and find *walk*. Put a cross on *walk*.

Show card with *fly*.

Move your marker down to the next row, and find *fly*. Put a cross on *fly*.

• To teach the third row of words: *round*, *clean*, *heavy* SAY:

1. These words tell about things we know.

Point to board.

They are *round*, *clean*, *heavy*. Say them after me: *round*, *clean*, *heavy*. Say them again: *round*, *clean*, *heavy*.

2. This word is *round*.

Point to *round*.

Lots of things are round; a ball is round; an orange is round; wheels are round. This word says *round*. What is the word? Yes, *round*.

3. This word says *heavy*.

Point to *heavy*.

A bag of groceries is heavy; a box of milk bottles is heavy; a big pail of water is heavy. This word always says *heavy*. What is the word? Yes, *heavy*.

4. This word says *clean*.

Point to *clean*.

Your faces are clean; when you wash the dishes, they are clean; when you sweep a floor it is clean. This word always says *clean*. What is the word? Yes, *clean*.

Using the flash cards SAY:

5. Now I'll show you these words on cards.

Show *clean*; hold it under *clean* on board.

This word is . . . *clean*. Yes, *clean*.

Show *round*; hold it under *round* on board.

This word is . . . *round*. Yes, *round*.

Show *heavy*; hold it under *heavy* on board.

This word is . . . *heavy*. Yes, *heavy*.

6. Now let's see if you know all these words on the cards.

Show each one in turn: *heavy, round, clean*.

What is this word? . . . Yes, *heavy*.

And this word is . . . *round*.

And this one is . . . *clean*. Good.

7. Now I'll ask you questions about these words.

Wait for yes or no responses. Show *round*.

Is a ball like this? . . . Yes, a ball is . . . *round*.

Show *heavy*.

Is a feather like this? . . . No, a feather isn't . . . *heavy*.

Show *clean*.

Are dirty hands like this? . . . No, dirty hands are not . . . *clean*.

8. Now let's see if you can find these words on your paper. Put your markers under the box in the next row.

Show card with *round*.

Find *round* and put a cross on it.

Show card with *clean*.

Move your marker down to the next row. Find *clean* and put a cross on it.

Show card with *heavy*.

Move your marker down to the next row. Find *heavy* and put a cross on it.

• To review words SAY:

1. Let's see if you know the words in the first row on the board.

Place flash cards below the words on the board.

This word is . . . *tongue*. Your tongue is red.

This word is . . . *eyes*. You see with your eyes.

This word is . . . *hair*. You have hair on your head.

2. Let's see if you know the words in the next row on the board.

Place flash cards below the words on the board, as before.

This word is . . . *walk*. A dog can walk.

This word is . . . *fly*. A bird can fly.

This word is . . . *swim*. Fish swim.

3. Now let's see if you know the words in the last row on the board.

Place flash cards below the words on the board, as before.

This word is . . . *round*. An orange is round.

This word is . . . *clean*. The dishes are clean.

This word is . . . *heavy*. A big rock is heavy.

Now we will wait and find out if you know these words later on.

Erase words on the board and put away flash cards. Collect test booklets. After approximately one hour, distribute test booklets. Test recall of words.

• To test recall of words taught, see that each child has his colored marker. THEN SAY:

Turn your booklet over to the back page and see the words.

Be sure children have the right page (page 8). Items 1-9 on page 7 are teaching items. Only numbers 1-18 on page 8 are actual test items.

Put your markers under the first row of words on this side of the paper.

Demonstrate.

1. In this row, find *tongue* and put a cross on it.

2. Move your markers down to the next row. Put a cross on *eyes*.

3. Move your markers down to the next row. Put a cross on *hair*.

4. Move your markers down. Put a cross on *walk*.

5. Move your markers down. Put a cross on *fly*.

6. Move your markers down. Put a cross on *swim*.

7. Move your markers down. Put a cross on *round*.

8. Move your markers down. Put a cross on *clean*.

9. Move your markers down. Put a cross on *heavy*. Now move your markers under the top row of words on the other side of the page.

See that all markers are in the right place.

10. In this top row of words, put a cross on *fly*.

11. Move your markers down to the next row. Put a cross on *hair*.

12. Move your markers down. Put a cross on *tongue*.

13. Move your markers down. Put a cross on *swim*.

14. Move your markers down. Put a cross on *walk*.

15. Move your markers down. Put a cross on *eyes*.

16. Move your markers down. Put a cross on *round*.

17. Move your markers down. Put a cross on *heavy*.

18. Move your markers down. Put a cross on *clean*.

The last sitting ends here. Collect test booklets.

LEARNING RATE TEST Sample Exercises

1	eyes	cold	hand
2	away	warm	tongue
3	sell	hair	went
4	train	swim	build
5	walk	boy	fire
6	help	most	fly
7	step	thank	round
8	sit	clean	water
9	heavy	dress	fold

1	tongue	walk	round	10	buy	farm	fly
2	clean	eyes	fly	11	hard	hair	pair
3	hair	swim	clean	12	table	hang	tongue
4	walk	heavy	eyes	13	swim	him	sweet
5	round	fly	hair	14	wore	talk	walk
6	tongue	heavy	swim	15	eyes	every	you
7	fly	round	walk	16	found	reach	round
8	clean	tongue	hair	17	try	heavy	heard
9	swim	heavy	eye	18	close	barn	clean

SCORE LEARNING RATE _____

SCORE BOX

TESTS		MAXIMUM POSSIBLE SCORES	SCORES		PERCENTILES	STANINES
Phonemes	Part I	20				
Phonemes	Part II	28				
	Total	48				
Letter Names	Part I	26				
Letter Names	Part II	26				
	Total	52				
Learning Rate		18				
Total Test		118				

APPENDIX B

WISCONSIN RESEARCH AND DEVELOPMENT
CENTER FOR COGNITIVE LEARNING

FORM FOR SECURING SUBJECTS AND USOE
CLEARANCE OF DATA-GATHERING PROCEDURES

APPROVALS & PROCESSING

Principal Investigator _____
Director, Technical _____
Development Program _____
School Liaison Officer _____
(If applicable)

Signature _____ Date _____
Clearance: Mailed to USOE _____
Received _____
Clearance of school name _____
Date _____

Project Code from Annual Report: R-2

Name(s) of Experimenter(s): David J. Gustafson

Specific Title of the Proposed Study: Learnability of Basic Sight Words

Purposes of the Proposed Study: To rank-order the first 100 words of the Great Atlantic and Pacific Sight Word List in terms of their difficulty in learning. This is a pilot

study which will be implemented to find out how long it takes to administer the test instrument and also to check out the instrument itself.

Precise Titles of Data-Gathering Instruments: _____

No title - simple score sheet of trials and errors.

Other Dependent Measures: None

Treatment: (See attached sheet).

Check one: Group Administered _____ Individually Administered X

Time required of each subject: Total of 1/2 hours spread over 1 days

Time required for completion of each instrument: 1/2 hour

Description of test situation: Child will meet with experimenter and will be taught 5 words by means of look-say learning.

Number of Subjects Required: 16 Age: 5-6 Grade: Kindergarten Other Characteristics:

(socioeconomic status, etc.): Nonreaders = No formal reading instruction

(8 boys and 8 girls)

Check desired locale: School X University _____ Other _____

Projected Date of Need for Subjects: Beginning January 30 Ending January 31

Need for Special Rooms or Equipment: Would like some small room if possible, can do the pilot in a corner of classroom if absolutely necessary.

Provisions for Reporting Progress and/or Results to Schools: *(NOT Applicable)*

Form of preliminary report: _____ Approximate date to be made: _____

Form of final report: _____ Approximate date to be made: _____

Special requests: _____

Proposed Design and/or Data Analysis: (See attached sheet).

Proposed Use to be Made of Data: Data will be used to examine if the rank-ordering of the words is greatly affected by variability of subjects.

Check your probable use of any of the following Center supporting staff or services:

Research design consultant	<u>X</u>	Measurement consultant	_____
Computer application consultant	_____	Materials development consultant	_____
Electronic technician	_____	Artist	_____
Keypunch operator	_____	Scorers	_____
Data analyst	_____	Test construction	_____
Computer programmer	_____	Data processing by computer	_____

INFORMATION TO BE SUPPLIED AFTER PLACEMENT OF STUDY:

Number of subjects: _____ Grade: _____

Location of subjects: Name of individual schools : _____

Name of school district: _____

Address: _____

Name of Contact: _____

Method of sampling subjects: _____

Exact dates of study: FROM _____ TO _____

Who will request permission to use the school's name in the report?

Experimenter _____ Technical Section _____

RESEARCH DESIGN

Sight Words

f a t
i t b h
h r b a h o e
o s o u n e u s
w t f t d y t e

S
u
b
j
e
c
t
s

Boys

1	x	x	x			x	x
2	x	x	x			x	x
3	x	x	x			x	x
4	x	x	x			x	x

Boys

1				x	x	x	x
2				x	x	x	x
3				x	x	x	x
4				x	x	x	x

Girls

1	x	x	x			x	x
2	x	x	x			x	x
3	x	x	x			x	x
4	x	x	x			x	x

Girls

1				x	x	x	x
2				x	x	x	x
3				x	x	x	x
4				x	x	x	x

TREATMENT

Each subject will be taught five (5) words. The words will be on flashcards. The flashcards will be shuffled and the words will be initially presented in the following manner:

How: This says how (Experimenter shows the subject the flashcard), as in the sentence, "How did you do it?" Can you read how? (Subject response) Good! Would you read it once again for me? (Subject response).

First: This says first (Experimenter shows the subject the flashcard), as in the sentence, "She was first in line." Can you read first? (Subject response) Good! Would you read it once again for me? (Subject response).

Of: This says of (Experimenter shows the subject the flashcard), as in the sentence, "We like that kind of candy." Can you read of?

(Subject response) Good! Would you read it once again for me?

(Subject response).

But: This says but (Experimenter shows the subject the flashcard), as in the sentence, "The dog is mine but you can pet him." Can you read but? (Subject response) Good! Would you read it once again for me? (Subject response).

And: This says and (Experimenter shows the subject the flashcard), as in the sentence, "The dog and cat ran home." Can you read and? (Subject response) Good! Would you read it once again for me? (Subject response).

They: This says they (Experimenter shows the subject the flashcard), as in the sentence, "They are friends." Can you read they? (Subject response) Good! Would you read it once again for me? (Subject response)

About: This says about (Experimenter shows the subject the flashcard), as in the sentence, "I know a lot about you." Can you read about? (Subject response) Good! Would you read it once again for me? (Subject response).

These: This says these (Experimenter shows the subject the flashcard), as in the sentence, "The birds like to eat these worms." Can you read these? (Subject response) Good! Would you read it once again for me? (Subject response).

As previously mentioned, each subject will be taught five (5) of the eight (8) words listed above. After each presentation of the five words, the cards will be reshuffled to insure random order. Then the words will be presented to the subject one at a time in isolation. If the subject cannot pronounce a word within ten (10) seconds, the initial presentation format in which the word is used in context will be repeated. This procedure will be repeated until the subject is able to say all five words without error or until he has completed twenty (20) trials. All errors and successes will be recorded on a score sheet and the words will be rank-ordered in terms of their difficulty, i.e. most errors = most difficult word.

In this pilot study all groups will have two (2) words in common. The words are about and these. The data from these two words should provide some evidence concerning the effect of variability between subjects upon the rank-ordering of the words.

INSTRUMENT

David J. Gustafson

Pilot Study: Learnability of Basic Sight Words

Below are the eight words randomly chosen from the Great Atlantic and Pacific Sight Word List and a demonstration sentence based upon the most frequent usage of each word according to West (West, M. A General Service List of English Words. London: Longmans, Green and Co. LTD, 1967).

1. How How did you do it?
2. First She was first in line.
3. Of We like that kind of candy.
4. But The dog is mine but you can pet him.
5. And The dog and cat ran home.
6. They They are friends.
7. About I know a lot about you.
8. These The birds like to eat these worms.

As can be seen from the data, groups 1 and 2 cannot be compared with groups 3 and 4. The reason for this can be seen from an examination of the two words about and these. The first two groups received words that all began with a different letter, while the last two groups had two words beginning with a and two words beginning with th. This made the task of discriminating between the words quite difficult for the latter two groups. That is why the total error scores for each word are much higher for the latter two groups. BY THE WAY, ALL THE NUMBERS REFERRED TO ON THE FIRST PAGE ARE THE NUMBER OF ERRORS EACH CHILD MADE ON EACH WORD IN TWENTY TRIALS OR UNTIL THEY LEARNED ALL FIVE WORDS.

Thus the relevant finding for your purposes is that when you present vocabulary words, you will have much greater success if the words you present are as DISSIMILAR as possible. Of course you can also notice from the findings which children can pick up quicker on vocabulary taught in a look-say fashion. But make your comparisons between groups 1 and 2, and groups 3 and 4, don't intermingle the results of all four groups because of the problem referred to above.

The rank order of the words was different for each group, but the rank order when all scores were counted was: first, of, but, how, about, and, these, and they. The th words were probably most difficult because a subject at this level analyzes by single letter and so the th combination would throw them completely off track. Children at this level seem to use the first letter of the word as the predominant clue. I believe other research has shown that probably a 1st grader cues in on both the first and last letters.

Another interesting tidbit is that boys did better than girls overall. The average error rate per boy for the five words totaled was 38.857, while the rate for the girls was 41.428. I had expected the opposite. Of course this was done on a very small sample and one can't make any statements that boys learn faster than girls (We would be immediately attacked by Attila the Hun and 30,000 women libbers!). This result wasn't treated statistically so I can't say the difference would be significant or not.

In closing I'd like to thank you again and tell you that I found you to be very gracious people. I appreciated your cooperation very much and have informed others of my opinions of your school. I've been away from the elementary scene for a year and a half and found it exceedingly refreshing to be in a vibrant school once again. This isn't just some guy apple polishing either. I was amazed at the behavior of the children in the halls, etc. Keep up the good work!

Sincerely,

David J. Gustafson
David J. Gustafson
Research Assistant

P.S. Mr. Danielson, if there is anything I can do for you regarding the Design or anything else (besides the flat tire), please let me know.

APPENDIX C

Sight Words* and Demonstration Sentences

- | | |
|----------|-------------------------------------|
| 1. the | <u>The</u> dog is sleeping. |
| 2. a | The man had <u>a</u> cat. |
| 3. to | Give the toy <u>to</u> him. |
| 4. and | The dog <u>and</u> cat ran home. |
| 5. of | We like that kind <u>of</u> candy. |
| 6. in | The horse lives <u>in</u> the barn. |
| 7. you | <u>You</u> can have it. |
| 8. is | What <u>is</u> your name? |
| 9. he | <u>He</u> is my friend. |
| 10. it | <u>It</u> is a cat. |
| 11. that | He said <u>that</u> he was big. |
| 12. was | The pig <u>was</u> dirty. |
| 13. on | The food <u>is on</u> the table. |
| 14. for | Let's go <u>for</u> a walk. |
| 15. are | Dogs <u>are</u> my friends. |
| 16. they | <u>They</u> are friends. |
| 17. I | <u>I</u> like you. |
| 18. with | Come <u>with</u> me. |
| 19. his | Take <u>his</u> book. |
| 20. said | Mother <u>said</u> yes. |
| 21. at | I am good <u>at</u> reading. |
| 22. as | It can be us <u>as</u> a kite. |
| 23. have | I <u>have</u> seen it before. |
| 24. she | <u>She</u> is your mother. |
| 25. what | You can do <u>what</u> you want. |

*Words are numbered according to frequency

- | | |
|-----------|--|
| 26. one | You may eat <u>one</u> cookie. |
| 27. this | The birds like to eat <u>this</u> worm. |
| 28. all | He took <u>all</u> of the cake. |
| 29. had | The dog <u>had</u> a bone. |
| 30. from | He got it <u>from</u> me. |
| 31. be | Please <u>be</u> good! |
| 32. can | You <u>can</u> take it. |
| 33. but | The dog is mine <u>but</u> you can pet him. |
| 34. there | <u>There</u> were six people on the bus. |
| 35. not | Do <u>not</u> pick the flowers. |
| 36. when | <u>When</u> did the cat scratch you? |
| 37. how | <u>How</u> did you do it? |
| 38. were | Where <u>were</u> you hiding? |
| 39. your | Take <u>your</u> book! |
| 40. do | What did you <u>do</u> ? |
| 41. each | <u>Each</u> day I read a book. |
| 42. will | If you eat breakfast you <u>will</u> be healthy. |
| 43. up | Climb <u>up</u> the hill. |
| 44. many | You have <u>many</u> friends. |
| 45. we | <u>We</u> may go to the movie. |
| 46. then | I saw him last week and told him <u>then</u> . |
| 47. her | He took <u>her</u> scarf. |
| 48. or | <u>Two or three</u> children were late for school. |
| 49. out | He went <u>out</u> to get a drink. |
| 50. some | Would you like <u>some</u> candy? |

51. them I put them in your desk.
52. write Can you write a poem?
53. their Their pencils are on the table.
54. about I know a lot about you.
55. by I was hit by a car.
56. like You fly like a bird.
57. see Can you see the book?
58. so Why are you so happy?
59. if If it snows, I might stay home.
60. these The birds like to eat these worms.
61. make Try not to make a mistake.
62. into Come into the room.
63. him Do you know him?
64. other Do you want the other one?
65. word Do you know the word?
66. would If you studied, you would pass.
67. water Don't fall into the water.
68. little He's a nice little dog.
69. two I have two pennies.
70. has He has seen it before.
71. did Did you see it?
72. people Many people live on my street.
73. an He ate an apple.
74. which Which horse do you like?
75. could He could do it.

- | | |
|------------|---|
| 76. time | What <u>time</u> is it? |
| 77. more | Do <u>more</u> and talk less. |
| 78. down | Come <u>down</u> from the tree. |
| 79. my | It is <u>my</u> book. |
| 80. no | I have <u>no</u> money. |
| 81. go | Please <u>go</u> to the store. |
| 82. get | Please <u>get</u> in the car. |
| 83. now | <u>Now</u> you can go. |
| 84. long | The <u>long</u> train left the station. |
| 85. find | What did you <u>find</u> ? |
| 86. look | <u>Look</u> at the picture. |
| 87. made | He <u>made</u> a snowman. |
| 88. just | That's <u>just</u> what I like. |
| 89. big | He's a <u>big</u> man. |
| 90. very | I like you <u>very</u> much. |
| 91. back | Go <u>back</u> to the line. |
| 92. first | She was <u>first</u> in line. |
| 93. way | Which <u>way</u> did you do it? |
| 94. over | Climb <u>over</u> the wall. |
| 95. too | I ate <u>too</u> much. |
| 96. than | She spells better <u>than</u> you. |
| 97. good | That's <u>good</u> work. |
| 98. use | <u>Use</u> the pen to write your name. |
| 99. day | What <u>day</u> is it? |
| 100. where | Stay <u>where</u> you are. |

APPENDIX D

INDIVIDUAL SCORE SHEET

NAME _____ AGE _____ SCHOOL _____ M ☐ F ☐

TRIAL NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
WORD _____																					
WORD _____																					
WORD _____																					
WORD _____																					
WORD _____																					

x = correct response
o = incorrect response

CLASSROOM

☐

National Evaluation Committee

- | | |
|---|--|
| Helen Bain
Immediate Past President
National Education Association | Hugh J. Scott
Superintendent of Public Schools
District of Columbia |
| Lyle E. Bourne, Jr.
Institute for the Study of Intellectual Behavior
University of Colorado | H. Craig Sipe
Department of Instruction
State University of New York |
| Jeanne S. Chall
Graduate School of Education
Harvard University | G. Wesley Sowards
Dean of Education
Florida International University |
| Francis S. Chase
Department of Education
University of Chicago | Benton J. Underwood
Department of Psychology
Northwestern University |
| George E. Dickson
College of Education
University of Toledo | Robert J. Wisner
Mathematics Department
New Mexico State University |
-

Executive Committee

- | | |
|---|---|
| William R. Bush
Director, Program Planning and Management
Deputy Director, R & D Center | Donald J. McCarty
Dean, School of Education
University of Wisconsin |
| Herbert J. Klausmeier, Committee Chairman
Principal Investigator
R & D Center | Richard A. Rossmiller
Director
R & D Center |
| Joel R. Levin
Principal Investigator
R & D Center | Dan Woolpert
Director, Management Systems
R & D Center |
-

Faculty of Principal Investigators

- | | |
|--|---|
| Vernon L. Allen
Professor
Psychology | James Lipham
Professor
Educational Administration |
| Frank H. Farley
Associate Professor
Educational Psychology | Wayne Otto
Professor
Curriculum and Instruction |
| Marvin J. Fruth
Associate Professor
Educational Administration | Robert Petzold
Professor
Curriculum and Instruction |
| John G. Harver
Associate Professor
Mathematics | Thomas A. Romberg
Associate Professor
Curriculum and Instruction |
| Frank H. Hooper
Associate Professor
Child Development | Richard A. Rossmiller
Center Director
Professor, Educational Administration |
| Herbert J. Klausmeier
V. A. C. Henmon Professor
Educational Psychology | Richard L. Venezky
Associate Professor
Computer Science |
| Stephen J. Knezevich
Professor
Educational Administration | Alan M. Voelker
Assistant Professor
Curriculum and Instruction |
| Joel R. Levin
Associate Professor
Educational Psychology | Larry M. Wilder
Assistant Professor
Communication Arts |
| L. Joseph Lina
Professor
Institutional Studies | |